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UNIVERSITY OF TORONTO

President's Report

FOR THE YEAR ENDING
30TH JUNE, 1939

JAN 16 1940

PRESIDENT'S REPORT

1938-1939

To the Governors of the University of Toronto:

GENTLEMEN:

I have the honour to present herewith my report on the academic work of the University and University College for the twelve months ending on the 30th June, 1939:

INTRODUCTION

The detailed reports of the faculties and departments of the University are appended. They have been carefully prepared by the several deans and heads, and give an extended account of the conditions, achievements, and problems within the University. They deserve careful reading. In my comments on the work of the year I give only supplementary information and a summary of outstanding features.

ATTENDANCE

The total number of students enrolled was 7,960, of whom 5,086 were men and 2,874 women; 7,322 being registered in the colleges and faculties, and 638 in the departments. The number of students proceeding to degrees was 6,410 and to diplomas 812. Of the students in attendance 3,799 came from Toronto, and 3,323 from other parts of the Province of Ontario. Every county is represented. There has been an increase in registration of 119.

Our general attendance for some years past hovers between 7500 and 8000. The increase of fees and the financial uncertainty due to the prospect of war will probably reduce registration next year. The aim of a university will always be to provide the opportunity of higher education for those most capable of profiting by it, and to secure quality rather than numbers.

THE STAFF

The total staff of the University and University College numbered 938, of whom 127 were professors, 84 associate professors, 99 assistant professors, 216 lecturers, associates (in medicine and dentistry) and instructors in the Ontario College of Education, 1 director, 1 assistant director, 412 demonstrators, fellows, and instructors with sessional appointments.

In the federated colleges there are 117.

The total number in the complete staff is 1055.

During the year we have suffered the loss of members of the staff in the past and present. The list is as follows:

A. P. Coleman, M.A., Ph.D. (Bres.), LL.D. (Queen's), D.Sc., F.R.S., F.R.S.C., professor emeritus of geology; appointed September 1, 1891.

Charles F. Heebner, Phm.B., dean of the College of Pharmacy from 1891-1938.

W. B. Hendry, D.S.O., B.A., M.B., F.C.O.G. (Eng.), F.R.C.S. (C.), professor emeritus of obstetrics and gynaecology; appointed July 1, 1907.

D. R. Keys, M.A., professor emeritus of English; appointed July 1, 1883. (Died July 11, 1939.)

Miss A. L. Laird, M.Sc. (Drexel), professor emeritus of household science; appointed August 16, 1906.

A. J. MacKenzie, B.A., M.B., LL.B., senior demonstrator in medicine; appointed July 1, 1901.

J. P. McMurrich, M.A., Ph.D. (Johns Hopkins), LL.D. (Tor., Mich., Cinn.), F.R.S.C., professor emeritus of anatomy; appointed July 1, 1907.

Gilbert Royce, B.A., M.B., associate professor of oto-laryngology; appointed July 1, 1911.

W. G. Switzer, D.D.S., associate professor of dentistry; appointed July 1, 1925.

The following retired:

F. C. Dyer, B.A.Sc., professor of ore dressing in the department of mining engineering; appointed July 1, 1909.

P. G. Goldsmith, C.B.E., M.D., C.M., F.R.C.S. (C.), professor of oto-laryngology; appointed July 1, 1911.

H. E. T. Haultain, C.E., professor of mining engineering; appointed October 1, 1908.

J. H. Mills, M.A. (Queen's), instructor in classics in the University Schools; appointed November 1, 1923.

H. C. Parsons, M.A., M.D., F.R.C.P. (London), associate in medicine; appointed July 1, 1903.

The following resigned their positions:

Miss K. E. Bennett, B.A., M.A. (Col.), lecturer in household science; appointed July 1, 1929.

M. A. Cameron, M.A. (British Columbia), Ph.D. (Tor.), assistant professor of educational research; appointed July 1, 1935.

J. A. Irwin, B.A., instructor in the University Schools; appointed October 1, 1910.

A. G. McPhedran, B.A., M.B., F.R.C.P. (C.), associate in medicine; appointed July 1, 1903.

G. F. Marrian, D.Sc. (London), F.R.S.C., professor of biochemistry; appointed July 1, 1933.

F. A. Mouré, Mus. Doc., bursar of the University; appointed June 1888.

J. Satterly, M.A., Ph.D. (Cambridge), lecturer in geology and assistant director of the Royal Ontario Museum of geology; appointed July 1, 1935.

The names and periods of university teaching of these distinguished members of our staff who have passed away or retired recall records of great personal achievement in the fields of teaching, research and publication.

Those who through the passing of the years are withdrawing from our active ranks deserve our gratitude for their fine services to the university and the community. May their leisure time be filled with new interests, old friendships and continued loyalty to the institution they have served so well.

Leave of absence was granted to:

For the session: G. A. Cline, M.A., instructor in University Schools; C. N. Cochrane, B.A., M.A. (Ox.), professor of ancient history.

For the Michaelmas term: F. V. Winnett, M.A., Ph.D., assistant professor of semitic languages.

For the Easter term: F. C. Dyer, B.A.Sc., professor of ore dressing in the department of mining engineering; N. J. Endicott, B.A. (Tor., Ox.), B. Litt (Ox.), assistant professor of English; J. G. FitzGerald, M.D., LL.D. (Queen's), F.R.S.C., F.R.C.P. (C.), professor of hygiene and preventive medicine and director of the

school of hygiene and Connaught Laboratories; L. T. Morgan, B.A. (British Columbia), M.A., Ph.D. (California), assistant professor of political economy; H. W. Price, B.A.Sc., professor of electrical engineering.

The following new appointments and promotions were made during the year:

In the Faculty of Arts:—Appointments: B. Wilkinson, M.A., Ph.D. (Manc.), professor of mediaeval history; S. D. Clark, M.A. (Sask., McG.), Ph.D., lecturer in sociology; L. Infeld, Ph.D. (Cracow), lecturer in applied mathematics; S. B. Jones, B.S. (Wash.), M.A., Ph.D. (Harv.), lecturer in geography; M. Joos, M.A. (Wisc.), lecturer in German; H. A. Logan, B.A. (Ac., Yale), Ph.D. (Chic.), associate professor of political economy.

Promotions: S. N. F. Chant, M.A., from an associate-professorship to a professorship in psychology; A. R. Gordon, M.A., Ph.D., F.R.S.C., from an associate-professorship to a professorship in chemistry; H. A. McTaggart, M.A. (Tor. Camb.), Ph.D., F.R.S.C., from an associate-professorship to a professorship in physics; F. E. Beamish, M.A. (McM.), from an assistant-professorship to an associate-professorship in chemistry; W. J. McCurdy, B.A. (Dal.), M.A., Ph.D. (Harv.), from an assistant-professorship to an associate-professorship in philosophy; H. Grayson-Smith, B.A., Ph.D., from an assistant-professorship to an associate-professorship in physics; E. K. Brown, B.A., D es L. (Paris) and A. S. P. Woodhouse, B.A., A.M. (Harv.) to professorships in English; P. H. Brieger, Ph.D. (Bres.) from a lectureship to an assistant-professorship in fine art; V. F. Coe, Ph.B. (Chic.) from a lectureship to an assistant-professorship in political economy; R. M. Saunders, A.M. (Clark), Ph.D. (Corn.), from a lectureship to an assistant-professorship in history; G. F. Wright, B.S., Ph.D. (Iowa), from a special lectureship to an assistant-professorship in chemistry.

In the Faculty of Medicine:—Appointments: J. K. W. Ferguson, M.A., M.D., assistant professor of pharmacology; F. O. Wishart, B.A., M.D., lecturer in hygiene and preventive medicine.

Promotions:—I. H. Erb, M.B., from a lectureship to an assistant-professorship in pathology and bacteriology; W. Magner, M.D., B.Ch., B.A.O., D.P.H., N.U.I., from a lectureship to an assistant-professorship in pathology and bacteriology; Miss M. A. Ross, B.A. (Dal.), M.A., Ph.D., from a lectureship to an assistant-professorship in biometrics.

In the Faculty of Applied Science:—Appointments: C. G. Williams, B.A.Sc., professor of mining engineering; G. F. Tracy, B.A.Sc., M.S. (Mass. Inst. Tech.), associate professor of electrical engineering; R. Leggett, M. Eng. (Liv.), assistant professor of civil engineering; V. L. Henderson, B.A.Sc., A.M. (Mich.), lecturer in applied physics; W. C. Macdonald, M.A.Sc., lecturer in chemical engineering; R. B. McIntyre, B.A.Sc., B.A. (Camb.), lecturer in applied mechanics; J. E. Reid, B.A.Sc., lecturer in electrical engineering.

Promotions: F. C. Dyer, B.A.Sc., from an associate-professorship to a professorship in mining engineering; J. T. King, B.A.Sc., from an associate-professorship to a professorship in mining engineering; K. B. Jackson, B.A.Sc., from an assistant-professorship to an associate-professorship in applied physics; W. G. McIntosh, B.A.Sc., from an assistant-professorship to an associate-professorship in mechanical engineering; V. G. Smith, B.A.Sc., from an assistant-professorship to an associate-professorship in electrical engineering.

In the Faculty of Household Science:—Appointment: Miss M. D. Smith, M.A., Ph.D., lecturer in food chemistry.

In the Faculty of Music:—Promotions: H. Willan, Mus. Doc., from a lectureship to a professorship; Leo Smith, Mus. Bac. (Manchester), from a lectureship to a professorship.

In the Faculty of Dentistry:—Appointments: P. G. Anderson, D.D.S., associate; Miss D. F. J. Berry, M.A., associate.

Promotions: J. H. Johnson, D.D.S., from an associateship to an associate-professorship; L. F. Krueger, D.D.S. (Iowa), from an associateship to an associate-professorship; C. H. M. Williams, D.D.S., B.Sc. (Dent.), from an associateship to an associate-professorship; R. S. Woollatt, D.D.S., from an associateship to an associate-professorship.

In the School of Nursing:—Appointment: Miss M. J. Wilson, B.A. (Sask.), lecturer.

In the Ontario College of Education:—Appointments: W. B. Gray, B.A., instructor in University Schools; Miss R. E. Ratz, B.A., lecturer in home economics; Miss M. E. Silverthorn, B.A. (Alberta), B.S. in L.S., A.M. (Ill.), assistant professor in library science.

In administration:—Appointment: C. E. Higginbottom, bursar, and secretary to the Board of Governors.

Honours were conferred upon members of the staff:

Professor W. P. M. Kennedy, head of the department of law, has been engaged as legal adviser to the Royal Commission on Dominion-Provincial Relations; Dr. Trevor Owen of the department of medicine has been elected a Fellow of the Royal College of Physicians of London, England; Professor C. H. Best of the department of physiology has delivered the Eastman Memorial Lecture in Rochester, N.Y., and has been invited to address the Yale Medical Society in New Haven, Conn. and to give the Renziehausen Memorial Lecture in Pittsburgh, Pa., to address a joint meeting of the Institute of Medicine of Chicago and of the Chicago Society of Internal Medicine in Chicago, and to give a Mayo Foundation Lecture in Rochester, Minn.; Professor E. A. Bott of the department of psychology has been elected President of the Canadian Psychological Association; Sir Ernest MacMillan, dean of the faculty of music, has been elected an honorary member of the Royal Academy of Music of London, England; Sir Frederick Banting, of the department of medical research, gave the Dixon Memorial Lecture in London, England; Professor J. W. Bain of the department of chemical engineering was awarded the Society of Chemical Industry medal; Professor T. J. Meek of the department of Semitic Languages was appointed annual professor of the American School of Oriental Research in Baghdad for 1939-40 and Director of the Joint Expedition of the University of Pennsylvania Museum and the Baghdad School at Tepe Gawra, Iraq, also appointed co-editor of "Ancient Oriental Documents and Studies" sponsored by the Western Reserve University; Professor Grayson Smith was elected a member of the Fifth Washington Conference on Theoretical Physics.

THE UNIVERSITY IN GENERAL

The reduction of our government grant by $100,000 has made it necessary to increase fees in all faculties, and to practise the most rigorous economies. Should revenues be still further decreased, it will be difficult to maintain our position as a university of front rank on this continent.

Several conferences have been held with the representatives of the Ontario College of Pharmacy in regard to a new agreement whereby students in pharmacy will continue to take certain subjects, such as chemistry, botany, pharmacognomy, in the University. Standards will be raised and probably next year a new scale of payment for the university services will be determined.

Dr. F. A. Mouré, the bursar and secretary of the Board of Governors, who has served the University for over fifty years, retired at the end of December, 1938, on account of ill-health. With great reluctance the Board accepted his resignation. His long experience, his clarity of thought and expression, and his efficient conduct of business were devoted without stint to the welfare of the University. Mr. Charles Higginbottom, the assistant bursar, now succeeds him.

One of the outstanding events of the year was the inauguration of the

Falconer Lectureship by the Right Honourable The Earl Baldwin of Bewdley in the month of April. His theme was the interpretation of democracy as an expression of the British people. For three nights Convocation Hall was crowded. The lectures have been published on this continent by our University Press, and over seven thousand copies have been sold. An autographed photograph of Lord Baldwin has been hung in Simcoe Hall.

Lord Baldwin's visit was a happy prelude to the visit of Their Majesties, The King and Queen, to our city, and to Hart House, a full account of which is given in the Warden's report on Hart House.

Members of the staff organised a branch of the Society for the Protection of Science and Learning for the purpose of aiding refugee scholars, forced to leave Europe by the Nazi persecutions. Happily this University has been able to find places on its staff in recent years for several distinguished ex-patriated scholars, and its teaching and research facilities have been greatly strengthened thereby.

Our congratulations are extended to Trinity and St. Michael's Colleges on the erection of their new residential buildings. The University noted with pleasure the appointment of the Rev. John Lowe of Trinity College to the deanery of Christ Church, Oxford, one of the most important academic and ecclesiastical positions in England.

We have lost by death two members of our Board of Governors—Sir Joseph Flavelle, Bart., LL.D., and Mr. Duncan McDougald. Sir Joseph was Chairman of the University Commission of 1905-6, which drew up the constitution under which our University is still operating. He had an intimate knowledge of the general working of the University, and devoted to its service his rich business experience, his broad outlook, and his balanced judgment. By his will he left to the University his spacious residence in Queen's Park (with a request that it be used for the benefit of the women members of staff and the women undergraduates), and the sum of $50,000 to establish fellowships in the School of Graduate Studies.

Mr. McDougald was most regular in his attendance at the meetings of the Board, and had made himself familiar with the intricacies of its business.

We offer our sympathy to the Council of the Federated College, Wycliffe, in the death of its beloved and efficient principal, the Rev. Canon R. B. McElheran.

During the year I sent out a questionnaire to all members of the teaching staff to ascertain the number of hours of teaching and laboratory work done by each, and the size of their various classes. The answers showed that the teaching load was heavy, perhaps in some cases unduly heavy. Too many lectures are no more to be desired than too few. Our staff is certainly doing its duty to the full in the lecturing field. Research and lecturing should be linked together; each will utilise the other.

On November 23rd, the Governor-General, Lord Tweedsmuir, paid a visit to the Connaught Laboratories both at the farm and in Toronto, and expressed his admiration at the equipment, the personnel and the work both of manufacturing and of research that was being accomplished. Dr. FitzGerald accompanied His Excellency on this occasion, the last unhappily before illness necessitated a prolonged rest.

On January 27th the Marquis of Lothian, as secretary of the Rhodes Trust, visited the University in connection with the choice of Rhodes Scholars and the general working of this benefaction. Our congratulations are heartily presented on his subsequent appointment to be His Majesty's ambassador to the United States.

The Marfleet Lectures this year were delivered by President Frank Aydelotte of Swarthmore College, secretary of the Rhodes Scholarship Committee of the United States, and since elected to the headship of the Institute for Advanced Studies at Princeton, in succession to Dr. Abraham Flexner. He discussed

"The Vision of Cecil Rhodes", "The Rhodes Scholars at Oxford" and "The Record of Rhodes Scholars on their return to the United States". These lectures will be published soon by the Princeton University Press.

Under an arrangement made by the Conference of Canadian Universities Dr. C. D. Ellis, professor of physics in King's College, University of London, spent some time visiting our department of physics and giving a course of lectures. It is a stimulus to have a visitor from another famous physical laboratory.

Every year for the past thirteen years the editors of school magazines throughout the Province gather in the West Hall of University College for a two days' convention. Mr. Dunlop of the extension and publicity department and I have the pleasure of welcoming them to the University. These young journalists hear addresses from members of our staff in the department of English and from experts in advertising, printing, lithographing and news and editorial writing. About one hundred were present this year.

At our annual reception on January 27th to the staff of the whole University and their wives over 1300 were present. This social gathering promotes a sense of unity and common membership in one great institution.

During the past academic year I delivered the Josiah Wood lectures at Mount Allison University, New Brunswick, on "Citizenship in relation to the University, the Dominion, and the Empire"; was chosen president of the Conference of Canadian Universities; and received the degree of D.C.L. from Bishop's University, Lennoxville, Q.

FACULTY OF ARTS

One chief purpose of this faculty is to provide an adequate and well-trained supply of teachers for the secondary schools of the Province. The Dean of Arts notes with gratification that there is a decided increase in the number of honour graduates of this University, who are entering the teaching profession. The examinations in the College of Education for the testing of knowledge of the subjects to be taught witness to the thorough training of our graduates.

In classical archaeology we have been fortunate in the services of Professor Homer Thompson. He has spent half of the year in actual excavation work in Greece, and the other half in teaching here. Owing to the political unsettlement of Europe, the American School at Athens is suspending its work for the present; this change of policy will enable Professor Thompson to give his whole time to his archaeological instruction and publication in this University. Professor Wace (of classical archaeology at the University of Cambridge) who visited us during the year, as the Armstrong lecturer in Victoria College, remarked that within a few years Homer Thompson would be recognised as the greatest living classical archaeologist. He is of the greatest value, both to the Museum and the University.

Sociology has been separated from Anthropology, and, for the time being, made a sub-department of economics and political science.

The excavations of Professor McIlwraith and Professor Nash near the town of Aylmer, have yielded many relics of a prehistoric Indian village.

Professor McIlwraith has given me the following report on this work of excavation:

"Nash and I arrived on the first of June. With one student assistant, and later two, it was a relatively easy matter to begin where Nash had left off last year, and we were very lucky in our local contacts. Fortunately or unfortunately the site proved to be much larger than we had expected. We found thirty-seven mounds of varying sizes, probably all early Iroquoian refuse heaps. It was quite impossible, nor would it have been wise, to excavate all of them; so we concentrated on what we felt to be representative ones, and carried on very careful digging, going down three inches at a time over ten-foot squares. I have never been in a place where there was so much material. I think we must have brought back nearly thirty thousand specimens, most of them small pieces of pottery.

We were fortunate enough to unearth a considerable number of rather spectacular specimens, as far as Ontario Iroquoian objects can be so described. Among these was a bone flute, I think the only prehistoric one from Eastern Canada, a small clay head, and a number of pieces of wood showing cutting with stone axes. Just at the end we ran into the imprints of several hundred posts, including one squared log about twelve inches in diameter. This is tremendously interesting, as it has been generally thought that the users of stone axes did not trouble to smooth down their timbers. The work will undoubtedly provide the basis for a good scientific report, with enough suitable material for one or two museum cases. I feel now that we know far more about the history of the early Iroquoian people in Ontario than we did before the excavation started. Our findings will attract a considerable amount of attention scientifically, as well as local and popular interest. A party from the University of Michigan came over while we were working, and went away rather impressed, I think. We also had one of the men who had been working for the University of Western Ontario; he was with us for a week, and I know that he left very short of sleep and definitely convinced of the care with which the University of Toronto and the Royal Ontario Museum of Archaeology were doing their work. We ran into the usual troubles of mosquitoes, heat, and dust, and the hours were long; but that is what one expects."

University college is in need of more adequate recreational facilities, and of a new residence for men. A campaign to provide the latter was inaugurated under the chairmanship of the Hon. G. Howard Ferguson, and from the Governors (out of bequests for the purpose), the Government, and private subscriptions a sum of approximately $250,000 has been promised. The estimated total expenditure is $350,000. A continuation of this effort as soon as world conditions permit will realise the amount required. A residence provides a rallying point for members of the college, past and present, and contributes largely to the general education of the undergraduates.

In the department of fine art Mr. Charles Comfort, the distinguished Canadian painter, has been secured to give the technical instruction.

FACULTY OF MEDICINE

The process of choosing students in medicine by not allowing those who fail in the first year to repeat their year has been in force this session. More students have gained honour standing and fewer have failed. So far the regulation has acted as a stimulus. Under the present system of recommendation for both junior and honour matriculation, a student may face his first external examination at the end of his first year. There is room for difference of opinion whether the examination at the end of this pre-medical year is the best period at which his ability to proceed in medicine should be finally determined. Those who fail receive fullest consideration; their cases are reviewed in the light of their career in the secondary schools as well as in the university. If they cannot repeat in medicine, they may register in some other course; their time is not wasted. Some this year have registered in arts, in engineering, or in dentistry.

The department of biochemistry suffered a severe loss in the appointment of Professor G. F. Marrian to the chair of chemistry in relation to medicine in the University of Edinburgh; but he has left behind him a school of research in the field of the chemistry of the sex hormones. He has been succeeded by Professor Lesslie Young (from University College, London, from which Professor Marrian came), who also worked on this continent under Dr. Anderson at Yale and Dr. Shaffer of Washington University. His field is the chemical mechanism of the detoxification process. His researches will enrich the scope of our biochemical teaching. He has lately been elected a Fellow of the Institute of Chemistry in Great Britain.

One of the most notable developments in the department of pathology under the leadership of Professor William Boyd is the re-arrangement of the

pathological museum, so that everything pertaining to each disease may be seen in one section.

During the season Dr. Harold L. Stewart, pathologist of the United States Public Health Service, now working in the Gibbs Memorial Laboratory at Cambridge, Mass., visited our museum and subsequently wrote to Dr. Boyd: "It was a real pleasure to call at your Institute of Pathology and see and hear your ideas on teaching pathology to students. During the time I was at Jefferson Medical College, when we used your text-book of pathology, I followed your publications on the organisation of a museum for student instruction pretty carefully. I must confess, however, that I did not come anywhere near appreciating the splendid system you have developed at Toronto." He suggests that Dr. Boyd should arrange for a sample exhibit of his type of museum at such a gathering as the American Medical Association, so that professors of pathology on this continent might get "a first-hand view of this valuable method of instructing students". Dr. Boyd has already arranged three rooms and hopes to add more during the coming year.

THE SCHOOL OF HYGIENE

This institution is generally recognised as one of the chief centres of public health teaching on the continent. Its holders of the diploma of public health are leaders in preventive medicine throughout the Dominion. In the future further emphasis will be laid on the training of physicians in public health generally and as health officers particularly.

This year was given the first formal course in public health engineering. This postgraduate course was made possible by the co-operation of the School of Hygiene, the Ontario Department of Health, the department of biology, and the faculty of applied science. Herein is illustrated what can be done or provided in any practical field by the combination of university resources.

The advance of preventive medicine and the increase in the products of the Connaught Laboratories are beginning to crowd even the enlarged building.

THE CONNAUGHT LABORATORIES

These are now completing their twenty-fifth year. The story of their origin and growth is most romantic and will always be linked with the names of Dr. J. G. FitzGerald and the late Colonel Sir Albert Gooderham. They have provided life-saving serums and vaccines, and have supported research and teaching in the field of preventive medicine. They have always operated as an institute of medical public service for the whole Dominion.

FACULTY OF APPLIED SCIENCE AND ENGINEERING

There has been for some years a steady increase in the number of students registered in engineering. In 1929-30, 701 were enrolled, this year 925. The prospects are for a further increase next term. This increase indicates a continued demand for young engineers to serve in the material development of Canada. There is almost a crowding in the departments of mechanical and chemical engineering. The teaching load of the staff is heavy, and several members have temporarily been laid aside. There must in engineering be a constant development and addition of courses to meet new demands and changing trends of engineering education.

The Board of Governors set aside $3,000 from the interest on the Wallberg bequest to make it possible for members of the teaching staff to take leaves of absence and visit other engineering schools on the continent. Such contact would freshen the instructors and stimulate interest in the latest developments of engineering teaching.

In response to suggestions from the Engineering Alumni and with the hearty concurrence of the staff it was resolved to have a survey made of our general

engineering requirements, problems and organisation. We have an excellent faculty of engineering, but we wish to make it still better by assuring ourselves that we are missing nothing of value in modern engineering instruction in any part of the world. We were fortunate in securing for the purpose of this survey one of the most eminent engineers in the United States, Professor Emeritus Dugald C. Jackson, who for nearly thirty years was head of the department of electrical engineering in the Massachusetts Institute of Technology. Since his recent retirement from active teaching, he has been making a survey of engineering curricula in the United States, and will come to us with ripe experience both as a teacher and an engineer, and as a scientist of broad culture and wide interests. Before making any additions to our buildings or equipment we shall await his report.

Mrs. William Crocker has generously established a loan fund in memory of her son, the late James Crocker, who was killed in a mining accident last year. This is designed specially to help students in this faculty. From the interest on the Wallberg bequest a sum of $2500 annually is devoted to a similar purpose. The repayments have been satisfactory.

FACULTY OF EDUCATION

The general trends here are to a larger enrolment in the specialist courses and to special interest in the supplementary courses in art, physical education, and shopwork, required by the changes in the secondary school curriculum.

The Library School has been able to do better work by reason of an addition to its teaching staff. Its graduates with the degree of Bachelor of Library Science are for the most part also graduates in arts, and seem to be readily placed in library positions.

FACULTY OF HOUSEHOLD SCIENCE

The death of Miss Laird vividly reminds us of the growth of this faculty. Two students formed the first graduating class; the graduates now number in all more than 1000.

There has been effected this year a closer integration between the teaching in household economics and food chemistry.

FACULTY OF FORESTRY

Heavy losses of pulpwood have been due to insect pests. The Dean suggests an insect protective service in each province, which might be joined with the fire-protective service. Fire-rangers could be trained for this purpose, and insect pests might thus be attacked in the early stages.

We are glad to note that the registration in forestry is again on the upgrade.

FACULTY OF MUSIC

Closer co-ordination between the University Faculty of Music and the lecture courses of the Toronto Conservatory of Music has made possible the extended courses of twenty-five lectures in each.

The summer school has been a great success. Teachers of international standing have been secured as instructors.

The honour course in music in the University has become established and includes students from all the colleges in the faculty of arts. Dean Sir Ernest MacMillan and Professors Willan and Leo Smith have charge of all the musical instruction.

THE SCHOOL OF GRADUATE STUDIES

On the efficiency of this school largely depends the reputation of the University in the world of scholarship. This field in Canada this University should increasingly occupy. The work of instruction and supervision can be carried

on with comparatively small expense to the University. What is specially needed is the provision of more fellowships and scholarships, if we wish our Canadian youth to continue their advanced studies in their native land. We are grateful for the generous bequest of the late Sir Joseph Flavelle, which will enable us to establish three more graduate fellowships. Our sister universities in the United States have been very generous in granting graduate fellowships to Canadian graduates who apply for them; and appreciate the thoroughness of the training given to Canadian students.

FACULTY OF DENTISTRY

A notable feature of the year's work has been the lecture-clinics given by members of the staff to the dental societies of the Province.

The work of research goes forward, particularly under Doctors Box and Lott.

The fine reputation of the college continues to draw every year a group of young Australian dentists, who take a year's graduate work in this faculty.

THE LIBRARY

The total number of bound volumes is 368,280 (an increase in the year of 16,000), and of pamphlets 140,500 (an increase of 5,000), a total of 508,780. The total circulation remains about the same as last year, over 360,000. In order to make readily available the contents of Canadian periodicals, the circulation department has continued its preparation of an index of Canadian periodicals. This is a real service to Canadian literature.

We are deeply grateful to Professor Lash Miller for the donation of his valuable chemical library of nearly 3,000 volumes.

The Library is crowded. In due time we ought to have either an extension or a new building.

UNIVERSITY EXTENSION AND PUBLICITY

This department has grown steadily during its nineteen years of existence, under the energetic and far-seeing direction of Mr. W. J. Dunlop.

The course in aerial navigation enters its second year with attendance doubled. The Dominion Government has loaned us a Link trainer. The courses in Marketing and for the Ontario Association of Real Estate Boards were new this year, and were largely attended. The lectures given in Marketing are being published in book form for the benefit of future classes.

The enrolment in the regular evening classes is 6730, about the same as last year. The lectures in outside centres are tending to be supplanted by more continuous instruction.

The Director gives much time to advising parents who apply to him in regard to the courses their children should most profitably take.

I may add that all these extension courses carry themselves financially by the fees paid. The University is making through this channel a fine contribution to the educational life of the Province. No longer are institutions of higher learning remote from the general life of the community; they are constantly ministering to that life, and on the university standard of instruction are meeting various public needs as these arise. Through these classes, the university is making and keeping new friends who appreciate the service given them.

DEPARTMENT OF SOCIAL SCIENCE

I report with regret that Dr. Grauer, the head of the department, resigned after two years of good service as director.

This school, designed to train social welfare workers, both in principles and in practice, has completed twenty-five years of substantial achievement. Those trained in it are occupying important positions in Canadian welfare work. It is seeking to keep up a wise balance between theory and practice. There is among

those most competent to judge, agreement that such training schools should be associated with universities, who can best supply the academic basis for practical training. We hope to secure a successor to Dr. Grauer in the course of the coming year.

The necessity of research work in the field of the physical sciences is universally recognised; it is high time to recognise a similar necessity in the field of the social sciences. I hope that finances will some day make possible the addition of a professor to direct research in this department.

THE SCHOOL OF NURSING

The progress of this school for the training of public health nurses has been remarkable under the leadership of Miss Russell. When it began its work in 1933, it had fifty full-time and 294 occasional students; in 1938-39 it had 115 full-time and 324 occasional. It gives courses in hospital teaching and administration, and indeed serves as a centre of research in nursing education.

The Rockefeller Foundation has generously given $250,000 for its permanent endowment. Under the auspices of the same Foundation, women students from 14 countries outside Canada have been in attendance during this session.

MILITARY STUDIES

This department has been more closely co-ordinated with the Faculty of Arts, and Major Barry Watson, the director, has been given the rank of assistant professor, and as such is a member of the Council.

New quarters have been purchased for this department at 119 St. George Street. Here also will be the headquarters of the Officers Training Corps. From the accumulated funds of the Corps a new drill hall will be erected in the rear of this building. This will provide much needed space for the 300 men who constitute the normal enrolment. The threatening European situation has evoked fresh interest both in the work of the Corps and in Military Studies.

HEALTH SERVICES

Dr. Porter reports that 2480 men have been examined, and that only 20 were found to be unfit for physical training. In the first year 162 men were 6 feet and over in height; the average height of these was 6 feet 1¼ inches, and their average weight was 160 lbs. He notes an improvement in the physical condition of men in the upper years. This indicates that university life under wise medical supervision has resulted in better general health. Arrangements have again been made to give x-ray tests for tuberculosis to students in mining engineering.

Dr. Gordon reports a total of 602 women who have had the physical examination. She points out the need of sufficient gymnasium and recreational facilities. These needs can now be met in due time owing to Sir Joseph Flavelle's bequest of his mansion "Holwood" to be used as a social centre for the women of the university.

A committee of the medical faculty have presented an excellent and suggestive report on a health service for the students. The cost involved has made it necessary to hold it over for further consideration.

ATHLETICS AND STUDENT ACTIVITIES

The opening of the gymnasium and swimming pool at night by the help of the athletic fee of $3 (asked for by the students themselves) has been a great boon.

The senior rugby team lost the championship this year; the Yates Cup went to the team of McGill University. In Canada college athletics are maintained as subordinate to academic studies, and do not, as is the case in some institutions across the boundary line, dominate the whole university. We must maintain

the amateur character of these sports, and resist the beginnings of influences that tend to their semi-professionalising. Through the possession of Sir Joseph Flavelle's residence the problem of an athletic building for women bids fair to be solved.

Hart House continues its good work as a unifying and educative influence in the university. The Honourable Vincent Massey never loses his interest in it; and owing to the generosity of the Massey Foundation, many improvements have been made in the decoration and furnishings of the rooms on the west side used for graduates. We are glad that the Warden's health is so much better, that he was able to carry on as usual this year.

The report of Mr. E. A. Macdonald, the secretary of the Students' Administrative Council, is full of interest and marks development in the range of the Council's activities. The Employment Bureau, the Loan Fund, and the Housing Service have made it possible for many students to continue and to complete their university courses. The Council, since it began its loan fund, has loaned in all about $25,000; and these loans are being well repaid. Mr. Macdonald notes that students who have been helped not only repay loans, but often make additional personal contributions to him for the help of other students coming on. The financial position of the Council is sound and strong. I am greatly indebted to it for its constant help in solving student problems and directing student energies.

THE ROYAL ONTARIO MUSEUM

Although the Museum is administered by a separate Board of Trustees, it is closely associated with the work of the University. Its directors of scientific departments are members of the teaching staff of the University. Its collections are becoming world-famous.

By the help of a grant from the Rockefeller Foundation Bishop White is publishing a series of illustrated volumes on the treasures of the Chinese department.

A spectacular addition to the museum of mineralogy is the crystal cave, which Professor Parsons has constructed out of exchanges made with the New York State Museum.

In the museum of palaeontology the series of mural panels, planned by the late Professor W. A. Parks and painted by Mr. G. A. Reid, R.C.A., has been completed. These represent the successive periods in the geological history of the world.

The total attendance at the Museum for the year ending 30th June was 255,134.

An interested and interesting visitor at the Museum during the year was Dr. John Ferguson of Peking, China, a Canadian by birth and for many years an adviser to the Chinese Government. Along with Bishop White, the late Sir Robert Mond and Mr. Sigmund Samuel, he was a donor of the magnificent "H. H. Mu Library", now housed in the Sigmund Samuel Gallery. Another distinguished visitor was Professor Wissler, head of the department of anthropology at Yale University, and keeper of the Museum of Natural History in New York.

RESEARCH

Even a cursory glance at the detailed reports appended will show that the whole university is imbued with the spirit of research. I drew attention last year to the fact that researches are more and more carried on by groups, such as those engaged in the study of silicosis; those members of the staff in paediatrics at the Sick Children's Hospital who are investigating the relation of nutrition to child health; those at the Toronto General Hospital and in the Connaught Laboratories who have been experimenting with heparin as a preventive of

blood-clotting after an operation. One of the most striking results of the research spirit has been the building in the physics department of an electron-microscope, which uses the electron instead of the light ray, and gives a magnification of 30,000 times. The possibilities thus opened up are incalculable.

I again refer to the need of adding two storeys to the Banting Institute to accommodate the growing work there carried on.

THE SUPERINTENDENT OF BUILDINGS

Colonel LePan reports that his office directly supervises 59 buildings and lends a helping hand to the federated colleges. An idea of the material size of the university's equipment may be gained from some items in his statement. The cost of fuel and purchased heat was $104,000. The average number of employees was 285; and their salaries and wages amounted to $329,000. Merchandise distributed through the Superintendent's stores reached the value of $97,000. The number of accounts passed for payment was 24,214. 1663 customs entries were cleared. The turn-over in the post-office was more than $37,500 (of which postage stamps accounted for $22,700). The total cost of operating the Central Heating Plant was $145,016.

VISITING LECTURERS

During the year the following special lectures were delivered:

Three lectures, inaugurating the Sir Robert Falconer Lectureship, by The Right Honourable the Earl Baldwin of Bewdley, K.G., former Prime Minister of Great Britain; three lectures on the Marfleet Foundation, by President Frank Aydelotte of Swarthmore College, on "The Vision of Cecil Rhodes"; four lectures on the Alexander Foundation, by Professor Douglas Bush of Harvard University, on "Modern Theories of the Renaissance", "Continental Humanism", "English Humanism" and "Milton"; on the Donald C. Balfour Lectureship in Surgery; a lecture by Professor Mont R. Reid, University of Cincinnati, on "Personal experiences with vascular problems in the laboratory and in humans"; a lecture by Mr. K. deB. Codrington, of the Victoria and Albert Museum, London, England, on "Indian Sculpture"; a lecture by Dr. Hans Simons, of the School of Social Research, New York, on "The Lesson of 1938"; two lectures by Professor E. Ermatinger, of Zurich, Switzerland, Exchange professor at Columbia University, on "Philosophy and Psychology in the German Lyric" and "German and German-Swiss Literature; a lecture by Sir John Boyd Orr, Director of the Rowett Institute, Aberdeen, Scotland, on "Food and Health"; a lecture by Mr. Philip Grove, on "Problems of Canadian Literature"; two lectures by Dr. G. S. Hume of the Geological Survey, Ottawa, on "Stratigraphy and Structural Features of the Turner Valley Oil Field", and "Oil Production in the Turner Valley Field"; three lectures by Professor C. D. Ellis, King's College, University of London, England, on "Nuclear Structure", "The Scattering of Particles", and "Electron Focussing"; a lecture by Professor Henri Grégoire, Dean, Faculty of Arts, University of Brussels, Belgium, on "Constantine and the Triumph of Christianity"; two lectures by Professor H. P. Robertson, Princeton University, on "The Expanding Universe: its Observational and Theoretical Status", and "The Singularity of the Schwarzschild Field in General Relativity"; a lecture by Dr. G. H. Whipple, Dean of the School of Medicine and Dentistry, University of Rochester, Rochester, N.Y., on "Anaemia and the Building of Haemoglobin in the Blood"; a lecture by Miss Elizabeth Wiskemann of the Royal Institute of International Affairs, on "Czechs and Germans"; a lecture by Malik Sir Firozkhan Noon, High Commissioner for India in the United Kingdom, on "India"; a lecture by Mr. W. G. Constable, former director of the Courtauld Institute, London, and Slade Professor of Fine Art, University of Cambridge, on "Appreciation of Pictures"; a lecture by Dr. William Lyon Phelps, professor emeritus of Yale University, on "Truth and Poetry"; Professor J. D. Ferguson of Western Reserve

University, Cleveland, Ohio, a lecture on "Burns"; a lecture by Sir Edward Mellanby on "Diet"; a lecture by Professor F. Oehlkers of the University of Freiburg to the students in botany; a lecture by Professor P. Jessup of Columbia University on "International Law"; a lecture by Professor Roscoe Pound, formerly of Harvard University on "Administrative Absolutism".

A series of lectures in "Marketing" was arranged by the Department of Political Economy and the Department of University Extension in co-operation with the Advertising and Sales Club of Toronto: Professor K. W. Taylor, McMaster University, on "The Commercial Policy of Canada"; Mr. Herbert Marshall, Dominion Bureau of Statistics, on "The Statistical Basis of Marketing Policy"; Professor H. Laureys, former director of Higher School of Commercial Studies, Montreal, on "Marketing Canadian Goods Abroad"; Professor Walter Thompson, University of Western Ontario, on "Retailing from the Consumer's Point of View"; Mr. D. R. G. Cowan, Commercial Research Department, Swift and Company, Chicago, on "Improving Marketing and Merchandising Methods through Research"; Mr. Henry King, Director of Research, Messrs. Cockfield Brown and Co., Montreal, on "New Problems in Advertising and Steps towards their solution"; Professor C. A. Curtin, Queen's University, on "Some Aspects of Resale Price Maintenance"; Mr. John Martin, Advertising Manager of Massey-Harris Company, on "The Farm Market"; Professor J. E. Lattimer, Macdonald College, on "Recent Developments in Co-operative Marketing"; Professor H. R. Kemp, University of Toronto, on "Some General Aspects of the Pricing Problem".

In celebration of the centenary of Lord Durham's report recommending responsible government for Canada, the Department of History arranged a lecture series: A lecture by Professor Chester New of McMaster University on "Lord Durham and the British Background", Professor G. W. Brown of the University of Toronto on "Upper Canadian Scene"; Dr. D. C. Harvey, archivist of Nova Scotia, on "Nova Scotia and the Durham Mission", and Professor Chester Martin, head of the Department of History, University of Toronto, on "The Report and its consequences".

The Department of Mathematics arranged the following course open to the teachers of mathematics in the secondary schools:

Five lectures by Professor R. Brauer, on "The infinite in mathematics", "Paradoxes of the Theory of Sets", "Real Numbers", "Constructions with ruler and compasses" (Geometrical part), "Constructions with Ruler and Compasses" (Algebraic part); Five lectures by Professor Robinson, on "Projective Geometry", "Relation between Projective and Euclidean Geometry", "Co-ordinate Systems", "Constructions—first and second degree"; three lectures by Professor Coxeter, on "The Regular Polyhedra", "Polyhedra and the Theory of Groups", "Star Polyhedra"; three lectures by Professor D. B. DeLury, on "Probability", "Probability and Statistics" (two lectures); three lectures by Professor A. T. DeLury, on "The Parallel Postulate—Saccheri, Lambert and Legendre", "Non-Euclidean Geometry—the introduction of Length", and "Euclidean Geometry and a limiting case".

In connection with the Department of Physics a course of four lectures was given by Dr. Gordon N. Patterson, of the Royal Aircraft Establishment, Farnborough, England, on "Problems of High-speed Flight".

The following lectures were given in Convocation Hall under the auspices of the Royal Canadian Institute:

By Mr. Arthur R. Clute, K.C., President of the Royal Canadian Institute, "The Presidential Address"; Dr. Peter M. Millman, David Dunlap Observatory, on "We visit the Moon"; Dr. Clark Wissler, Curator-in-chief, American Museum of Natural History, New York, on "Anthropology and Human Behaviour"; Dr. Arthur L. Day, Physical geologist, Carnegie Institution, Washington, D.C., on "Hot Springs and Volcanic Activity in New Zealand"; Mr. Earl A. Trager, Chief, Naturalist Division, National Park Service, Washington, D.C., on "Wilderness Wonderlands"; Dr. R. E. Wodehouse, Deputy Minister of Pensions and

National Health, Ottawa, on "Safeguarding Canada's Health"; Dr. M. F. Crawford, Department of Physics, University of Toronto, on "Light and the Structure of the Atom"; Dr. E. W. McHenry, Physiological Hygiene, University of Toronto, on "Nutrition in Toronto"; Professor Thomas R. Wilkins, University of Rochester, N.Y., on "Some Studies in Radioactivity"; Dr. A. J. B. Wace, Professor of Classical Archaeology, Cambridge University, England, on "Sparta in the Light of the British Excavations"; Professor C. D. Ellis, King's College, University of London, on "The Atom and the Nucleus"; Professor A. F. Coventry, University of Toronto, on "The King Township Survey"; Professor G. P. McRostie, Ontario Agricultural College, on "The Manufacture of Plants"; Professor M. S. Viteles, University of Pennsylvania, on "Pstchology and the day's work"; Professor C. Leonard Huskins, McGill University, on "Biology and Civilisation"; Mr. George W. Wheelwright, Land-Wheelwright Laboratories, Boston, on "Polaroid"; Dr. H. G. Little, Assistant General Manager, Chemical Group, Canadian Industries Limited, Montreal, on "Research and Industry"; Dr. H. F. J. Lambart, Geological Survey, Ottawa, on "Recent Explorations in the Nahanni Mountains in the Northwest Territories of Canada"; Lieut.-Colonel Haig Shekerjian, Chemical Warfare Service, Washington, D.C., on "Defence against Chemical Warfare"; Dr. Peter H. Buck, Anthropologist, Bernice P. Bishop Museum, Honolulu, Hawaii, on "Vikings of the Sunrise".

SPECIAL CONVOCATIONS

Three special convocations were held:

September 2nd, when an honorary degree of Doctor of Laws was conferred upon The Right Honourable Viscount Greenwood, P.C.

October 14, when the honorary degree of Doctor of Laws was conferred upon Her Excellency The Lady Tweedsmuir, The Right Honourable Ernest Lapointe, Minister of Justice and Attorney-General of Canada, W. Sherwood Fox, Ph.D., LL.D., President of the University of Western Ontario, Sir Firozkhan Noon, High Commissioner for India in London, England, J. J. Gibson, B.A., a Governor of the University, J. C. Robertson, M.A., professor emeritus of Greek Language and Literature, Victoria College, Miss Jean Gunn, O.B.E., Superintendent of Nurses, Toronto General Hospital. The honorary degree of Doctor of Science was conferred upon W. R. Graham, B.S.A., professor of poultry in the Ontario Agricultural College, T. L. Walker, M.A., Ph.D., F.R.S.C., professor emeritus of Mineralogy and Petrography, University of Toronto. The honorary degree of Doctor of Engineering was conferred upon J. B. Challies, C.E., President of the Engineering Institute of Canada. The honorary degree of Doctor of Music upon Henri Jordan, Conductor of the Schubert Choir of Brantford.

April 20, when the honorary degree of Doctor of Laws was conferred upon the Right Honourable The Earl Baldwin of Bewdley.

LEARNED SOCIETIES

The following Learned Societies met at the University:

The Gynaecological Association of North America; The Association of Experimental Biology.

GIFTS

Four glass decanters, in a silver case, for the Croft Chapter House, University College, were given by Mrs. A. Croft Jarvis. They were presented to her father, Major Croft, by the Queen's Own Rifles in 1867.

BENEFACTIONS

During the year the University has received the following benefactions, totalling $145,197.95:

From the Rockefeller Foundation: Child Research and Parent Education, $10,083.24, Psychiatry Research, $10,400, School of Nursing, $10,000; Eaton

Endowment, $25,000; University College Men's Residence Fund: Rt. Hon. Sir William Mulock, $6,666.68, T. Eaton Company Limited, $5,000; Carnegie Corporation: Fine Art Professorship, $5,028.12, Institute of Child Study, $5,021.87; J. S. McLean Fellowship: Canada Packers, $5,000, J. S. McLean, Esq., $1,250; Reuben Wells Leonard Bequest, $6,240.85, Reuben Wells Leonard Fellowship and Scholarships, $5,850; Organic Chemistry, Anonymous, $5,000; Ontario Mining Association, Silicocis, $5,000; Webster-Seccombe Memorial Fund: Wallace Seccombe Memorial Scholarship, $2,008.78, Albert E. Webster Memorial Scholarship, $2077.78; Josiah Macy Jr. Foundation, for neurogenic research, $3,621.94; Steerola Exploration Company Limited, $2,565.76, Noranda Mines, $1,000, for Sir John McLennan Fund; Minnie Carson bequest, $2,545.80; Eli Lilly Fellowship, $2005.00; Mount Sinai Masonic Lodge Silver Jubilee Loan Fund, $2,000; Reg. N. Boxer Scholarships: Donald E. Boxer, $1,000, Richard J. Boxer, $1,000; Scottish Rite Donation, Dementia Praecox research, $1,883.98; Maude Charlton Gibson Scholarship, $1,511.49; Flavelle-Peacock Retiring Allowance: Sir Joseph Flavelle, $750, Sir Edward Peacock, $750; Graduate Fellowships: Imperial Oil Company Ltd., $500, Lady Kemp, $500, Sir Joseph Flavelle, $250; Arthur Cohen Scholarship, $1,120.00; Sir Robert Falconer Lectureship, $1104.70; Charles E. Schofield Donation, cancer research, $1,000; D. A. Dunlap Memorial Scholarships, $1000; American Society of Heating and Ventilating Engineers, $500.94; Jas. W. Crocker Memorial Loan Fund, $500; Sadowski Scholarships, $500; Jenkins Scholarship, Engineering, $500; Sir Edmund Walker Scholarship, $450; Robert Simpson Company Scholarships, $450; Gertrud Davis Exchange Fellowship, $400; Emerson Wickett Memorial Scholarship, $375; Robert Bruce Scholarship, $372.04; B'nai B'rith Scholarships, $350; Oral Health Magazine: Wallace Seccombe General Proficiency Prize, $150, Oral Health Thesis Prize, $100, Oral Health Thesis Prize $50; School of Nursing Undergraduate Bursary Fund, $300; University College Alumni Matriculation Scholarships, $300; Ohio Chemical Company Fund, Professor V. E. Henderson, $300; Jule and Jay J. Allen Award, $250; S. R. Parsons Scholarship, Commerce and Finance, $250; J. B. Willmott Scholarship, Dentistry, $250; Geo. R. Smith Fund, Ontario College of Education, $250; Percy Hermant Scholarship, $250; Anonymous for Mary Keenan Award, $200; Pan-Hellenic Association of the University of Toronto Prizes, $150; J. A. Findlay Scholarship, $150; Boiler Inspection and Insurance Company Scholarship, $150; Sir John C. Eaton Memorial Scholarship, $120; U.T.S. Old Boys' Association Scholarships, $100; Maurice Hutton Matriculation Scholarship, $100; University College Alumnae Scholarship, $100; Herbert Willson Scholarship, $100; Delta Phi Epsilon Bursary, $100; Association of Professional Engineers of Province of Ontario Scholarship, $100; University Tours Association Scholarship, $100; Darling and Pearson Prize, Architecture, $100; Ontario Association of Architects Scholarships, $100; George Kennedy Scholarship, $83.10; Sarah Kennedy Scholarship, $83.10; W. G. Switzer Memorial Award, $82.50; St. Margaret's College Alumnae Scholarship, $75; Hollywood Theatre Prizes in French, $50; Deborah Assembly No. 5 Bursary (Order of Rainbow for Girls), $50; Dr. R. A. Reeve Prize, $50; Class of 1930 Mathematics and Physics Bursary, $50; Public Speaking Association Bursary, $50; F. W. Jarvis Bursaries, $50; Hon. Charles McCrea for Dent McCrea Scholarship, $50; Ramsay Wright Scholarship, $48.58; Justice Riddell for Riddell Scholarship, Law, $30; Lambda Chi Alpha Association of Toronto for R. S. Saddington medal, $30; Hon. Dr. J. A. Faulkner for Faulkner Medal, $26.81; Labour Research Institute Prize, Law, $25; Engineering Institute of Canada Prize, $25; American Society of Heating and Ventilating Engineers, Ontario Chapter Prize, $25; Ontario Medical Association Prize, $25; Toronto Brick Company Prizes in Architecture, $25; University College Alumni Prize, $25; Pi Lambda Phi Fraternity Prize, $25; British A.A.S. Fund, $20.39; Maurice Cody Memorial Scholarship, University Schools, $11.50; University College Alumnae Prize in English, $10; Fletcher-Johnston Memorial Prize, $10.

NEEDS

Even under the threatening shadow of war, it is well to state once more some of the university's needs:—

A sufficient income to maintain the university in efficient service.

An addition of two storeys to the Banting Institute for the extension of medical research.

An enlargement of the Chemical Building in the Faculty of Arts.

Additional accommodation for Chemical and Mechanical Engineering.

More scholarships in the Faculties and more fellowships in the School of Graduate Studies.

More books and more space for the central Library.

Two needs mentioned in my last year's report—a new residence for University College, and an athletic building for the women of the University—are, as I have already mentioned, in process of being supplied.

CONCLUSION

1. Since the beginning of the century there has been on this continent a steady increase in the number of students who have entered universities and colleges. There has been a notable popularisation of higher education. Even the interruption caused by the Great War was of short duration; the movement surged forward again. In the United States, within the years from 1900 to 1930 attendance at institutions of higher learning increased sevenfold. A somewhat parallel increase has taken place in Canada. There has been faith in the value of more and higher education; college graduates have entered the fields of finance and industry; the professions have increasingly required more college training as a condition of entrance; the material development of the country called for more engineers; the entrance of women into wider areas necessitated a preparation through the university; some of the new immigrant stocks had profound respect for education and determined to secure it for their children; the college "as a way of life became increasingly popular—not to go to college was to undergo a social deprivation as well as to suffer a professional handicap".

Our universities have tended to attract or to create professional schools in connection with their organisation. Their place in a university is justified if their curricula are worth while, if there is real scholarship in the teaching, if there is a social necessity for them, and, above all, if the general principles underlying them are adequately emphasised.

It would seem that in Canada there are signs that for the time being we have reached a peak of attendance. In our own university our registration has been fairly steady for some years past. One of our chief duties is to select those who are best able to profit by our opportunities and make it possible for them to attend. A still wider establishment of scholarships and loan funds will aid in giving equal educational opportunities to all.

2. One of the most notable developments in recent years is the growth of various forms of university extension and adult education. In this development our university has taken a significant part. Education is now regarded not as an achievement completed when we leave school or college; but as a process continuing as long as life. Chancellor Chase of New York University well puts this aspect of the situation: "Unlearning and relearning must go on constantly. College and university are but preludes to education."

3. Higher education has striven to do two things: to train leaders, and to seek to diffuse a high level of intelligence and appreciation of the best. In realising both these ideals, the universities are making their contribution to the preservation of a sane democracy. Can we afford, then, to let our universities die? Chancellor Chase again speaks with confidence of the future: "The future of our higher education is too firmly rooted, is too fundamental a part of our way of life not to survive any catastrophe short of the crippling of that civilisation".

4. But is higher education safe? Many thoughtful academic leaders on this continent are anxious about its future. The fall of interest on funds for endowment, and the curtailment of legislative assistance, have forced fees up to a point which may close the universities to those of moderate means. At various conferences of university heads in North America I have heard an almost uniform report. Diminished income is threatening the quality of university work, is limiting research and retarding necessary library growth; and is affecting the morale of staffs by suspending normal promotions and salary increases. University teachers have courageously faced salary reductions in past emergencies; but if reductions due to emergencies become chronic, there is a real danger that the efficiency of the institution will suffer. This University is grateful for its legislative grants, and realises that it must share in general reductions of expenditure; but it hopes that the point will not be reached when its educational service to the Province will be impaired. Grants to education in all its grades are not a public charity, but a safe investment, which will yield a rich increase to the real wealth of the land.

5. A recent article in a university magazine bears the title, "Higher Education on the Stand", and points out that to-day "universities are asked to stand and deliver". Well, universities have something to say for themselves. Their aim to-day is not to develop a self-centred culture, but to inspire men and women to use knowledge, discipline and culture in the service of the community. They seek to relate themselves to the needs and aspirations of the State; their task is greater as the complexities and problems of democracy increase. They are meant to be "clearing-houses of intelligent thought, free from political propaganda". Our citizens in a democracy ought to understand our history, our modern civilisation, our basic principles of freedom, the values of our present political and social organisation; to provide this understanding is one of the prime aims of a university. The universities train teachers for the secondary schools and the larger elementary schools; and these teachers to a great degree determine the intellectual interest, the public spirit, the literary taste and the moral tone of each generation as it passes from adolescence to manhood. The universities provide the broad professional services for the community, in the Church, in medicine, in law, in dentistry, in engineering, in forestry, in pharmacy, in dietetics, in public health nursing. In detail, they provide the highest training in the application of science to all developments of life. Trained scientists are needed if we would discover the full extent of our natural resources, to develop and conserve them, and to develop and improve our methods of industry, commerce and agriculture. Universities can focus whatever information the science can provide for any form of service to the State; from their trained staff will naturally come investigators in the fields of science, economics or history, whose expert knowledge will be of value to administrators and legislators. From research work in medicine the universities have already given to the world results of incalculable practical benefit to humanity. But probably the best contribution which universities can give to the community are men and women, possessed of that store of knowledge, power of discrimination and balance of judgment, which a college course aims to give and very largely succeeds in giving. No country can have a surplus of intelligent citizens. The present Archbishop of York, Dr. William Temple, aptly summed up the fruits of a university training as "a disciplined mind, a wide sympathy, and a quickened imagination". The watchwords of higher education are culture and service. The functions of a living university may be recapitulated as the cultivation of the spirit of learning and of research; the training of citizens in a liberal education and a tolerant mind; the provision of broad professional courses; and the transmission of the sacred fire of knowledge.

Our own Governor-General, Lord Tweedsmuir, at his installation as Chancellor of the University of Edinburgh said: "A university has two plain duties. It has to transmit knowledge and to advance knowledge. It must be regarded

as not only a seminary for the training of youth, but as a museum for record, a laboratory for discovery, a power-house for inspiration."

Among the institutions of Western civilisation, the university is the oldest, with the exception of Roman law and the Christian Church. It has survived dynasties and kingdoms and revolutions. As a living organism, it has adapted itself to the needs of changing ages. To-day it still holds the allegiance and confidence of youth, as it seeks to educate for life in a changing world, as it adjusts the oncoming generations to take an intelligent part in making inevitable changes wholesome and progressive and in relating the new to the old in a continuing stability. To weaken or to starve the university means in the long run to weaken and to starve our civilisation.

6. Heavy indeed is the burden of administration in a university as large and as varied as this; it is made heavier by the inevitable anxieties about finances, which an inadequate income creates. But my task has been lightened by the help constantly given by the academic and administrative staff, by the loyal and self-governed undergraduate body, by the many benefactors of the university, by the Chairman and members of the Board of Governors whose wisdom and experience have so ably served this institution, and by the Government of the Province which has largely provided for our annual maintenance. To all these our thanks are due and are unreservedly given.

All of which is respectfully submitted.

H. J. Cody
President

December 14, 1939

APPENDIX A

(1) Report of the Dean of the Faculty of Arts
(2) Report of the Principal of University College
(3) Report of the Dean of the Faculty of Medicine
(4) Report of the Dean of the Faculty of Applied Science and Engineering
(5) Report of the Dean of the Ontario College of Education
(6) Report of the Secretary of the Faculty of Household Science
(7) Report of the Dean of the Faculty of Forestry
(8) Report of the Dean of the Faculty of Music
(9) Report of the Dean of the School of Graduate Studies
(10) Report of the Dean of the Faculty of Dentistry
(11) Report of the Director of the School of Hygiene
(12) Report of the Librarian
(13) Report on Research
(14) Publications
(15) Report of the Director of University Extension and Publicity
(16) Report of the Director of the Department of Social Science
(17) Report of the Director of the School of Nursing
(18) Report of the Director of the Department of Military Studies
(19) Report on Health Services
(20) Report on Athletics and Physical Training
(21) Report of the Warden of Hart House
(22) Report of the Director of the Connaught Laboratories
(23) Statement regarding the Museum of Archaeology
(24) Statement regarding the Museum of Biology
(25) Statement regarding the Museum of Geology
(26) Statement regarding the Museum of Mineralogy
(27) Statement regarding the Museum of Palaeontology
(28) Statement regarding the educational work of the Royal Ontario Museum
(29) Report of the Director of the David Dunlap Observatory
(30) Report of the O.C. The Canadian Officers' Training Corps
(31) Report of the Secretary-Treasurer of the Students' Administrative Council

(1) REPORT OF THE DEAN OF THE FACULTY OF ARTS

(Professor Samuel Beatty, M.A., Ph.D.)

Figures confirm the impression growing in recent years that increasing numbers of our honour graduates in Arts are seeking careers as secondary school teachers. It is gratifying to discover that their record at the qualifying examinations for specialists' standing is well above the average of all who write. At the same time, many graduates in the sciences find technical or research positions in industry, while the majority of the commerce graduates receive executive or administrative posts in business.

The pass course for teachers continues to minister to those who are forced by circumstances to delay their university work and to pursue it under somewhat unusual conditions. From the outset the standard reached by them has compared favourably with that set by the regular students in the pass course, and their numbers are such that more than half of those who complete the requirements in August for the B.A. degree are enrolled in the pass course for teachers.

The arrangement whereby students failing in the first year of Medicine may be considered for transfer to the second year of the pass course in Arts is working out satisfactorily.

It is being taken for granted increasingly by the staff and by those responsible for individual appointments and promotions that scholarship and research activities are matters of primary importance. Associated with this, it is the duty of each member of the staff to consider and decide for himself how best to encourage and stimulate his students to do effective work.

The level of attainment of the best students entering the first year has never been higher. This is due in part to the increased competition for matriculation scholarships and to the fact that the recommendation system shows to particular advantage in the case of really good students.

(2) REPORT OF THE PRINCIPAL OF UNIVERSITY COLLEGE

(Professor M. W. Wallace, M.A., Ph.D.)

I have the honour to submit my annual report as Principal of University College:

There have been no changes in the personnel of the staff of the College during the session. Professor C. N. Cochrane has spent the year in England supervising the publication of a volume by the Oxford Press; during the summer he will give a course of lectures in the University of Oxford before returning to resume his regular duties in September. Professor Winnett spent last summer and the Michaelmas Term in the Near East where he was able to carry on research work in spite of the disturbed conditions in Palestine. Professor Endicott of the department of English has leave of absence for the present Easter Term and will continue his studies in England until September.

About ninety students have been given bursary assistance during the present year. Small as the grants are to each student, they are in many cases sufficient to determine the holder to continue his college course, and many of our ablest students would have found it impossible to take an academic course without this assistance. As usual many members of the graduating class have received appointments to fellowships in American universities, and of these the great majority had been assisted during their undergraduate course either by being granted bursaries or by being holders of scholarships. The increase in intuition fees for next session will bear heavily on many of our students. Of recent years it has been increasingly difficult for the children of farmers and mechanics to aspire to a college education, and a large proportion of our bursary and scholarship holders come from homes accustomed to straitened financial circumstances.

The number of students enrolled in the college during the present academic year (1128) is slightly larger than that of last year, and I think we may assume that for the immediate future our enrolment will be stabilised at about this figure. Our residence accommodation for both men and women is fully taken up, and we are looking forward eagerly to being able to house a larger proportion of our male students in our own building. A college residence, properly administered, can become a powerful educational instrument. At the recent examinations, for instance, every student in our men's residence was successful, and the proportion of high honours secured by them was most gratifying. Accordingly, it is a most important project for the welfare of the college which has been launched during recent months by the College Alumni Association,—the providing of a Men's Residence which will house at least one hundred students. The Honourable G. Howard Ferguson ('91) accepted the chairmanship of the committee charged with the securing of the necessary money, and he has had the enthusiastic coöperation of the Provincial Government, the Board of Governors of the University, and the Alumni body. More than two-thirds of the necessary sum ($350,000) has already been pledged, and it is hoped that before the end of the calendar year the total amount will be raised. It is hardly possible to overestimate the significance in the life of the college of this project. The new residence should become a centre for all the interests of the men students, and should do for them something comparable to what Whitney Hall has already accomplished for the women undergraduates.

An Athletic Dinner, which it is hoped will become an annual event, was held in the Junior Common Room on March 23. On this occasion the President of the University presented to the college a beautiful challenge trophy to be awarded to the outstanding athlete of the graduating year. The Robert Simpson Company, Ltd. also presented on the same occasion a challenge cup for swimming, and the T. Eaton Company Ltd. a special prize for athletics.

Benefactions of graduates and friends of the college since my last annual report are as follows:

(*a*) A bursary of $70.00 from the Psi Psi Chapter of the Alpha Chi Omega Fraternity.
(*b*) A bursary of $50.00 from the Public Speaking Association.
(*c*) A Prize of $50.00 in the department of French from the Hollywood Theatre.
(*d*) A Prize of $25.00 in the graduating year from the University College Alumni Association.
(*e*) A Prize of $25.00 in the department of French from the University College French Club.
(*f*) A silver basket containing four glass decanters formerly belonging to Professor Croft and bequeathed to the college by his daughter,
(*g*) Gifts of books:
  (1) Some forty volumes formerly belonging to Professor Croft and presented to the College by Professor W. Lash Miller.
  (2) The reprint of Audubon's *Birds of America* from the staff in mathematics.
  (3) The second volume of Harrap's Standard French and English Dictionary from Professor J. Home Cameron. Professor Cameron presented the first volume to the college in March, 1934.
(*h*) A painting by Mr. John Alfsen, presented by W. M. Wismer, a graduate of 1938.

The Alexander Lectures were delivered on January 17-20 by Professor Douglas Bush, professor of English in Harvard University, who is a graduate of the University of Toronto (Victoria College). The subject of his lectures was *The Renaissance and English Humanism.* The attendance taxed the capacity of Hart House Theatre on each afternoon. On January 26 Mr. F. P. Grove lectured before a large audience of staff and undergraduates on *The Creative Mind.* The following course of open lectures was given during the Michaelmas Term by members of the staff:

Aldous Huxley	Principal M. W. Wallace
Liam O'Flaherty	Professor L. A. MacKay
T. E. Lawrence	Mr. W. S. McCullough
Hugh MacDiarmid	Professor R. S. Knox
John Collier	Professor N. J. Endicott
George Santayana	Dean G. S. Brett
James Joyce	Dr. A. E. Birney
Robinson Jeffers	Professor E. K. Brown
T. S. Eliot	Professor H. R. MacCallum

(3) REPORT OF THE DEAN OF THE FACULTY OF MEDICINE

(W. E. Gallie, M.D., F.R.C.S.)

The annual report of the Dean of the Faculty of Medicine had its beginning in a brief review of the activities of the Faculty which was used by the President in writing his annual report. It has gradually changed, however, until now it takes the form of a letter to all the graduates, which seems to be very generally read and which, judging from the many approving comments we have received, is welcomed by them as a contact with their Alma Mater.

The most important changes that have occurred in the Faculty during this year are related to the curriculum and examinations for first year students. It has been pointed out in previous reports that the number of students in this school has gradually increased until they have seriously taxed the clinical facilities of our hospitals and made it difficult for us to maintain a standard such as that of those schools in which the numbers of students have been limited. To this difficulty is added the fact that many students have been able to enter medicine who have no aptitude whatever for a long and difficult course of study. The result has been that they have had failures year after year and have not only had a miserable time themselves but have retarded the general advancement of the class as a whole.

The obvious remedy would be to establish some form of test during the premedical year which would enable the faculty to detect at an early stage those students who are unsuited to the course and to eliminate them before it is too late for them to make a start in some more suitable form of life work. This plan has been adopted and has proved successful in quite a large group of students who had obviously made a mistake in their choice of a profession.

Unfortunately, among the fallen have appeared the names of the sons of some of our graduates and, indeed, of the sons of members of the faculty, and as a failure in the first year means that these students may not continue, it would appear that the time is ripe for a plain statement of the character of the course in medicine in this university.

Entrance is by way of senior matriculation, in which English; mathematics; one of—German, French; one of—physics and chemistry; zoology and botany, a second foreign language with physics, a second foreign language with chemistry, are compulsory. All applications from citizens of the Province of Ontario are accepted and a limited number also from the sister provinces, particularly where there are no medical schools. Occasionally, applications from the sons of our graduates who have moved away from Canada are favorably received.

During the autumn of the first year the student tries the "Scholastic Aptitude Test" for Medical Schools, of the Association of American Medical Colleges, a written paper consisting of a mixture of 350 to 400 questions designed to discover whether he has the type of mind that is suitable for a medical career. The results are filed with his matriculation record and with the marks he makes in the various term tests throughout the year. The final examination in May is composed of papers in biology, physics and chemistry, in which fifty percent must

be obtained in each subject and sixty percent on the average, and papers in French or German and in the history of science and civilisation in which fifty percent is the passing standard. A failure in the science group eliminates the candidate from the course but a supplemental examination may be taken in the fall if he is down in one of the languages or in the history of civilisation. No one may repeat the first year and the only way a student could get back into the medical course would be by transferring to the Arts Faculty and obtaining a degree in a course which included the equivalent of our first year.

A rather important change is being made this year in the curriculum of the first year as it has been represented that too much emphasis has been placed on the foreign language. Hereafter, therefore, the student may select, if he chooses, in place of the foreign language, a course in English or a course in modern history. In place also of history of science and civilisation, he may select a course in philosophy or one in anthropology. Fifty percent must be obtained at the examination to secure a pass standing and one supplemental can be taken in the fall. These courses will be conducted by the Faculty of Arts.

While these changes in no way lessen the difficulties of the first year, except for those students who have a natural ineptitude for foreign languages, they do broaden the field considerably and enable the student to select, in addition to his premedical sciences, a course of study in cultural subjects which will be of great value to him in later years.

The second and third years are devoted to anatomy, physiology, biochemistry, embryology, histology, psychology and general pathology. They are very busy years during which the student is employed all day long in laboratory or lecture hall and he must devote a great deal of time to reading. He has very little opportunity for indulging outside interests.

The fourth, fifth and sixth years are the clinical years and a large part of the time is spent in the study of medicine, surgery, obstetrics and the specialties in the hospitals (Toronto General, St. Michael's, Toronto Western and the Hospital for Sick Children). In addition, extensive courses are given in hygiene and preventive medicine, pathology, pathological chemistry, pharmacology, therapeutics, bacteriology, radiology and radiotherapy and physiotherapy. The sixth year is almost equivalent to an intern year as the student spends ten weeks in hospital in medicine, ten weeks in surgery and ten weeks in obstetrics and the specialties. From a practical standpoint it is the most valuable year in the course.

Scattered through the three clinical years are short courses on medical jurisprudence and toxicology, history of medicine, dentistry, medical ethics and economics, life insurance and applied physiology.

In the second and third years, the student who has passed in all but one subject, is eligible to proceed to the next year, provided he passes the supplemental examinations in the fall; whereas in the fourth, fifth and sixth years, he may write supplemental examinations in two subjects. A failure to pass in more than one subject in the second or third year, or in more than two subjects in the last three years, or a failure to pass the supplemental examinations, causes him to lose his year and puts him in the position of either dropping out of the course, or applying for permission to repeat the entire work of the year. A failure at the end of a year in which he is repeating the course eliminates him from the course.

From this it will be seen that the course for the degree of Doctor of Medicine can no longer be faced without careful consideration. The student who enters should be physically fit and should be a good student, that is, one who has obtained high grades at matriculation, who is capable of facing difficult courses of study with reasonable prospects of success and who is willing to work hard. Students who enter medicine with credits in matriculation, with a low standing in their scholastic aptitude test and with a grade of fifty percent or lower in their first year examinations have been shown almost invariably to have failures

throughout their course, so that the faculty has no doubt whatever that the best plan for the school, and in the end, the kindest plan for the student is to eliminate him from the course at once and let him start over again in something else before it is too late.

To our graduates, therefore, I would suggest that they consider carefully their boy's natural aptitude for this type of study before allowing him to register and when this is finally decided upon I would recommend that from among the matriculation options he select biology, physics and chemistry and that he secure his matriculation by the road of the departmental examinations rather than by recommendation. The experience gained in these examinations will be useful to him at the end of his first year in the university.

I cannot refrain from commenting sadly on the necessity for the general raising of the annual fees, owing to the reduction of the annual government grant to the university. Since thirty years ago the increases in fees and the length of the course has made the cost of a medical education three times what it formerly was. Had the cost been anything like as much in the early part of this century very few of the present professors could have entered medicine. The result is that a smaller and smaller proportion of the bright boys from farm and village are coming up to the university, much to the disadvantage of the professions.

During this year the Faculty of Medicine was requested by the Board of Governors to suggest a plan of reorganisation of the University Health Service. A committee of the faculty studied this question carefully and came to the conclusion that the present service was inadequate and could be much improved in certain directions. These were first, in the complete physical examination of all students with a view to the detection of physical defects and incipient disease; second, in providing primary medical attention particularly for students in residence or boarding houses who are taken ill or are injured; and third, the inauguration of a general course of lectures on problems of hygiene and health. The plan was approved in general by the Board of Governors, but owing to the expense involved, action was deferred. In the case of the medical students, however, an enlargement of the service was introduced in the form of a tuberculin test and an x-ray of the chest in those who were found positive, followed by a careful examination in those in whom suspicious signs were discovered. It has been felt that by these measures the incidence of serious pulmonary tuberculosis might be reduced.

Reference to the departmental reports will indicate the vast amount of research at present going on in the various laboratories. It is always difficult to predict the importance of many of these studies but those that are brought to a conclusion always add something to the sum total of our knowledge and often form the basis of real progress in medicine. Some of them, among which are those on silicosis and on heparin have already been shown to be of great practical value. For their work on silicosis, Dr. D. A. Irwin of the department of medical research and Dr. W. D. Robson of the McIntyre Porcupine Mines were awarded the McCharles Prize and for his work on the use of heparin, Dr. Gordon Murray was appointed Hunterian professor in the Royal College of Surgeons of England.

The Charles Mickle Fellowship for this year was awarded to Charles Herbert Best, M.A., M.D., D.Sc., London, F.R.S., F.R.S.C., F.R.C.P., professor of physiology, University of Toronto, acting head of the department of physiological hygiene, research associate in the Banting and Best department of medical research and associate director of the Connaught Laboratories, for his contributions in certain branches of physiology, in particular those related to diabetes and carbohydrate metabolism, to histamine and histaminose, to choline and fat metabolism and to heparin and thrombosis. This fellowship is awarded each year to that individual, wherever he may be, who in the opinion of this faculty has contributed most during the preceding ten years to advance sound knowledge of a practical kind in medical art or science. The award of the Charles Mickle

Fellowship to Dr. Best will be approved by all for not only is he one of the most distinguished among physiologists but his contributions have been of such intensely practical importance that they are understood and gratefully acknowledged by the whole world.

Dr. Best is also in receipt of the Baly Gold Medal awarded by the Royal College of Physicians, for his physiological researches.

Honours have come to Professor Duncan Graham in the form of election as President-elect of the Canadian Medical Association, to Professor J. H. Elliott, who has been appointed representative for Canada in place of Dr. Vallee, on the Council of the International Association of the History of Medicine, and Vice-president of the Section of the History of Medicine of the American Medical Association, to Dr. Trevor Owen who has been elected to Fellowship in the Royal College of Physicians of London, and to Dr. D. E. Robertson who was made President-elect of the American Orthopaedic Association, President of the Academy of Medicine and Vice-president of the American Orthopaedic Association.

The Balfour Lecture was delivered on Lister Day, April 5th, by Mont R. Reid, A.B., M.D., professor of surgery, College of Medicine, University of Cincinnati. The subject was "Personal Experiences with Vascular Problems" and was a beautiful realisation of the purposes that the founder had in mind that our students should from time to time be given the opportunity to meet distinguished surgeons from other lands and to hear them discuss the subjects that have made them famous.

The Charles Mickle Lecture was delivered on October 4th by Sir Edward Mellanby, K.C.B., M.D., F.R.S., on "Recent Researches in Nutrition". It will be recalled that the Charles Mickle Fellowship was awarded in 1935 to Sir Edward and Lady Mellanby. Unfortunately, Lady Mellanby was ill and could not be present but Sir Edward has suggested that on some future occasion she may be able to lecture here.

Post graduate courses were conducted in the latter part of September by the department of medicine on metabolic and endocrine disorders and by a combination of the departments of gynaecology, radiology and surgery on cancer. These courses were well attended and evidently appreciated. The idea of spending a whole week in the intensive study of some one important subject has become well established and the courses will be continued.

In addition to these special postgraduate courses, ninety-two addresses were given by fifty-four speakers from the Faculty of Medicine, under the auspices of the Ontario Medical Association.

The new members who have joined the faculty this year are Dr. J. K. W. Ferguson and Dr. Leslie Young. Dr. Ferguson is a graduate in arts and medicine from this university and comes now from the department of physiology in the University of Iowa to be assistant professor of pharmacology with Professor V. E. Henderson. Dr. Young comes from the department of biochemistry at University College, London, to be associate professor here.

Professor G. F. Marrian, who has been in the department of biochemistry here since 1933, has resigned to accept an appointment as professor of chemistry in relation to medicine in the University of Edinburgh. Professor Marrian is a most distinguished young chemist who has already made a name for himself in his researches on the sex hormones (referred to in previous reports) and the honor of appointment to the important chair in Edinburgh is richly deserved.

The promotions and new appointments for the year are as follows:—

Art Service: Miss E. Hopper to replace Miss Foster who has resigned.

Banting and Best Department of Medical Research: Dr. G. E. Hall to be promoted from associate professor to professor.

Biochemistry: Dr. A. M. Wynne, professor, from associate professor.

Physiology: Dr. D. Y. Solandt, associate professor, from assistant professor.

Radiology: Dr. A. C. Singleton, assistant professor, from associate.

School of Hygiene: Drs. E. W. McHenry and D. L. McLean, associate professors, from assistant professors.

Retiring, June 1939:

Dr. A. G. McPhedran and Dr. H. C. Parsons, to whom reference is made in the report of the department of medicine. Dr. P. G. Goldsmith, professor of oto-laryngology. Dr. Goldsmith has been head of his department since 1922 and during that time has brought it to a position of distinction among the otolaryngological teaching units of America. The Faculty sincerely regrets that the time has come for his retirement from university work and hopes that he will have many years of enjoyment of the practice of his profession.

It is my sad duty to record the deaths during the past year of an unusually long list of distinguished men who did much to bring this school to the position it occupies to-day. They are Dr. W. B. Hendry, formerly professor of gynaecology and obstetrics, Dr. James Playfair McMurrich, formerly professor of anatomy Dr. A. J. Mackenzie of the department of medicine, Dr. Gilbert Royce, formerly associate professor in the department of otolaryngology and Dr. W. B. Thistle, formerly professor in the department of medicine.

(4) REPORT OF THE DEAN OF THE FACULTY OF APPLIED SCIENCE AND ENGINEERING

(*C. H. Mitchell, C.B., C.M.G., C.E., D.Eng.*)

The students of this Faculty have continued to apply themselves to their studies in a manner which is highly satisfactory. This feature of the academic work throughout the past session appears to be the natural outcome of the earnest and serious work of the preceding several years in the period of technical and business recovery.

It is encouraging that the young men of this generation realise that notwithstanding the tendency to unrest and superficial education, it is necessary for them to thoroughly equip themselves in applied science for the necessities of the rapidly changing and growing requirements of the country. They realise that the country needs their services and that the more conscientiously and efficiently they prepare themselves, the more useful they can be and the greater their opportunities and reward.

The continued increase in attendance of students in this Faculty commands renewed attention. In last year's report this increase was pointed out, and an attempt was made to forecast the future trend. It was, however, somewhat of a surprise to be confronted last September with a marked resumption of increase in the first year, an increase from 276 to 319, or over 15 per cent. There had been no increase in the previous year, but the increases in the two preceding ones were 14 and 12 per cent. respectively. It is equally difficult to anticipate the number likely to enter next year, but it is fair to assume that there will be a number approaching last year, notwithstanding the increase in the fees, which has been necessitated and notice of which was given some months ago. Unsettled world conditions may, of course, have some effect, but such cannot be predicted.

It is, however, in the total number in the Faculty, and in the manner in which they distribute themselves in the various courses, that difficulties of instruction and accommodation arise. If, even with increasing first years, the students distribute themselves in appropriate proportions, difficulties in this respect may not occur. The facts are, however, that they continue to crowd into the mechanical and chemical engineering courses, with the result that these, with their limited accommodation, consequently suffer in this respect. The increases in the first year this session have been 56 per cent. in mechanical and 18 per cent. in chemical engineering, and these have been superimposed upon

increases in the preceding years. Such increases cause extreme difficulties in both instruction and accommodation when such large groups arrive in the senior years, and our experience has been that efficiency cannot be maintained without much labour, anxiety, and strain on the part of our limited staff.

Attention was drawn in this report a few years ago to the increasing numbers of students coming to this Faculty, and it is now important again to present these, brought up to date, to obtain a perspective of the interest young men are taking in this field of education. The following table covers attendances for the past ten years, from the period before the depression. These figures may be considered as barometric, indicative of the material development of the country in industry and business.

ATTENDANCE IN FACULTY OF APPLIED SCIENCE

Session	I Year	II Year	III Year	IV Year	V Year (Arch.)	Total
1929-30	276	158	150	117	—	701
1930-31	329	231	151	139	—	850
1931-32	281	286	175	139	—	881
1932-33	265	250	236	157	6	914
1933-34	226	238	203	207	9	883
1934-35	221	189	198	179	8	795
1935-36	248	175	160	176	7	766
1936-37	282	205	154	136	12	789
1937-38	276	227	174	148	8	833
1938-39	319	225	212	163	6	925

Examination of this table leads to the reasonable conclusion that the steady increase of recent years is likely to continue for at least several years unless unforeseen causes dislocate the steady upward trend in engineering education which is discernible in both Canada and the United States. Adopting the usual methods of forecasting attendance in a four years' course, it is to be expected that, assuming an incoming first year of about the same or even less than last year, the attendance in this Faculty next year is likely to approach a thousand students.

With respect to the academic performance of the students in the four years in this Faculty, it is desirable to draw attention to this year's results in comparison with those of the previous sessions. In last year's report these results were referred to and four observations were made arising from a study of ten years' results. It was noted that failures had definitely declined, especially in the first year. It is to be reported, however, that in the examinations of this session the failures in the first year have again noticeably increased. An effort is now being made to ascertain the cause of this and to discover how much may be attributable to the methods of matriculation, wherein increasing numbers of students are coming into this Faculty by the process of recommendation rather than by matriculation examinations set for the purpose—a system which became effective five or six years ago. The following table of failures is presented for these comparisons:—

PERCENTAGES OF FAILURES IN ANNUAL EXAMINATIONS

	1939	1938	1937	1936	1935	1934	1933	1932
First Year	29.0	22.7	24.9	32.2	27.5	23.7	21.0	21.4
Second Year	16.0	13.2	19.2	23.5	26.5	18.0	20.8	19.6
Third Year	6.8	7.6	7.3	17.2	10.6	11.5	8.0	11.5
Fourth Year	4.2	0.7	1.4	1.2	2.8	4.4	1.3	4.4

Changes continue to be made in curriculum. Changes in the past two or three years have been very considerable, the numerous additions being due mainly to provision for instruction in various new phases in applied science in practically all graduating departments. Heads of teaching departments in this Faculty have been assiduous in their endeavour to meet these new and changing

trends in a desire to anticipate the requirements for suitably educated young men going out into engineering and business fields, which have materially changed in the past decade. The technical requirements of today impose many new subjects which ten or twenty years ago were not in the applied science picture; nowadays engineering education has come to be a mosaic of a complicated and multi-coloured pattern.

The curriculum in the calendar of the Faculty for the coming year contains 269 lecture courses of varying lengths of one or both terms, and accompanying these are 189 laboratory courses, 458 courses in all. This total is over 50 per cent. more than that contained in the calendar of ten years ago and constitutes a measure of the extent by which the work and load of this Faculty has expanded in the past decade.

It is now apparent that the staff of the Faculty is endeavouring to carry a very heavy load, and similarly calls upon the students to do likewise while performing their work in the same period of time in the two terms comprising the university session. Not only is this represented in more work, but in a greater diversity of work in the increased number of new fields or phases of instruction. The number of members of the academic staff carrying this load the past session comprised 39 professors of all grades, 14 lecturers, 9 instructors, and 40 demonstrators, together with three administrative officers. 14 special lecturers were called in from outside to assist. Subordinate staffs in offices, laboratories, and service workshops in all grades comprised 32 additional, the whole making a total of 151 members. In addition to these, other Faculties contributed in various forms of instruction through 28 professors and 17 lecturers and demonstrators, a total of 45.

Attention must again be drawn to the great need of additional building accommodation and equipment, especially in the departments of chemical and mechanical engineering. The situation in this regard has become much more acute the past two years, and will be more so during the next two, because of the large classes passing through to the senior years. This has been brought continuously to notice for the past nine years or more and it must be emphasised that the situation is now so much more acute that efficiency of instruction is definitely impaired. It is with much reluctance that this statement has now to be made in more definite form than heretofore.

With respect to the general situation in this Faculty in regard to increasing attendance, continuously expanding curricula in an endeavour to meet new trends, inadequacy of staffs, and lack of sufficient building accommodation and equipment, it is with gratification that we learn of the intention of the University to afford opportunity for senior members of the staff of this Faculty to examine and study other similar institutions with a view to still further improving our own. It is further most gratifying to learn that similarly, from suggestion through the Engineering Alumni Association with the cooperation of this Faculty, authorisation is now given to have a survey made of the whole structure and work of the Faculty in curricula, staff, building accommodation and equipment, and a relation to the development of the industries and engineering activities of the country, by an independent outside expert in engineering education with wide experience and vision. Such a survey will be most helpful and will be welcomed by the Faculty as a constructive measure in which all members will be anxious to lend hearty cooperation along with the Alumni.

The employment of graduates and their adoption into the activities of the country has been most gratifying. The past few years this has been uppermost in the minds of educators, students, and industry alike, and this year the ratio of employment of graduates has proved to be again about ten per cent. greater than the previous year. There is no doubt that the country can readily absorb all the graduates of this Faculty in the various departments.

Research has continued in the Faculty with the same enthusiasm and resulting success in applied science fields under the direction of the School of

Engineering Research. A report of these activities, signed by the Chairman of the Committee of Management, accompanies this report. It will be observed that there have been 24 researches done during the session, on subjects which bear on useful phases and applications in the engineering and industrial fields, which is the prime objective of the School.

With the commencement of the session, the new head of the department of mining engineering, Professor C. G. Williams, took over his duties. It was with the greatest of pleasure that the Faculty welcomed Professor Williams to this post, bringing, as he does, a very wide and valuable experience in this field.

It is with some anxiety that we have to report illness of various senior members of the staff throughout the session. Great regret is expressed with the enforced retirement of Professor F. C. Dyer, of the department of mining engineering. He was suddenly stricken with a serious illness and wholly incapacitated at the commencement of the session. Professor Dyer has served the University with ability and great faithfulness for over thirty years, and his loss will be much felt.

The illness of other members of the staff, coinciding during the session, has given their colleagues much concern. Five members, all of professor and associate professor grades, have necessarily been absent on sick leave for various periods of from two to six months during the session, and one professor is now being given a year's leave of absence, to recuperate. These unfortunate circumstances appear to reflect an overworked staff, due to loads in various departments; illness of key members of any staff inevitably imposes additional burdens on colleagues, so that difficulties of overload increase. Serious thought is being given to this problem, which has arisen probably because of over-crowded curriculum and insufficient facilities for instruction to the increasing numbers of students.

(5) REPORT OF THE DEAN OF THE ONTARIO COLLEGE OF EDUCATION

(*Dr. J. G. Althouse*)

Total registration figures of the Ontario College of Education showed an increase of 65 over the previous year; in the High School Assistants' Course, there was an increase of 90. The general trend towards heavier enrolment in the Specialist courses was sustained, and unusual interest was shown in the supplementary courses in Art, Physical Education and Shop Work.

The revised course of study in the Library School, greatly facilitated by the appointment of Miss M. E. Silverthorn, B.S., A.M., as lecturer in Book Selection, made a favorable impression. In addition to the regular laboratory work in the Toronto libraries, an arrangement was made this session with the Hamilton Public Library and with the Rochester (N.Y.) Public Library for student practice work. Ten students availed themselves of this privilege and expressed appreciation of the experience gained.

During the year the department of educational research, at the request of the Matriculation Conference and the Department of Education carried out a searching investigation into the academic records of all students entering the faculties of Arts of Ontario universities in 1932. Reports of the investigation were submitted to each of the universities concerned, and a final report was presented to the Matriculation Conference under the title, "*The Relation between Matriculation Marks and the Achievements of Students in Ontario Universities*". Two French Tests in Grammar and Vocabulary, for first and second year high school, were completed, and the Advanced Group Test of Intelligence for high school pupils has progressed to the stage when norms can be established. A start has been made on a series of reading tests for the elementary schools. Members of this department participated in the New Education Conferences held in

Hamilton and Detroit, and in the Ottawa meeting of the American Association for the Advancement of Science.

Two members of the department, who have rendered yeoman service for several years, departed to assume positions of greater responsibility. Dr. C. B. Conway became a Special Inspector in the Department of Education of the Provincial Government in British Columbia, and Dr. M. A. Cameron became Professor of Education and Acting Head of the Department of Education in the University of British Columbia.

This report would be incomplete without reference to the resignation of two veteran members of the staff of the University of Toronto Schools. Ill health caused the retirement of Mr. J. A. Irwin, B.A., after 28 years' service in the Schools. For the greater part of that period Mr. Irwin had been senior master of the junior school and a veritable tower of strength to three successive headmasters. Mr. J. H. Mills, M.A. reached the retiring age in full vigor of mind and body and after an unparalleled record of preparing scholarship winners.

(6) REPORT OF THE SECRETARY OF THE FACULTY OF HOUSEHOLD SCIENCE

(Professor C. C. Benson)

The registration in the faculty has, this year, been about the same in number as it was last year, and with much the same distribution. We have again had a number of students coming from Macdonald Institute and entering the third year. This year we have been glad to find that many of them have come with better preparation, and have entered the specialist branch of the course for the degree of Bachelor of Household Science. These students have done good work and have obtained standing. The other students from Macdonald Institute, however, who entered the pass course were, unfortunately in some cases, unable to complete the work, and we are very sorry to have to report four failures in this year from among these students. The first year students, too, have seemed to be badly prepared, and far too many of them were unable to obtain standing.

In this session the staff members have, in general, been about the same as they were in the previous session, but one assistant in the department of household science has been married, and a graduate from the Bachelor of Household Science specialist course has taken her place. In the department of food chemistry one of the members of the staff has been married and is withdrawing this year.

It is with regret that we record the death of Miss Annie L. Laird who, until her retirement three years ago, had been professor of household science from the beginning of this work in the University. Under her direction household science work has developed greatly. From a graduating class of two, as the first to graduate from the Faculty of Household Science, the numbers have grown so that by this time more than one thousand students have graduated with the degree of B.A. from the department of household economics, or with the degree of B.H.Sc. from this faculty. Miss Laird built a good foundation for the study of the various branches of household science, had seen that the students so trained have undertaken useful and valuable work for which they were well prepared, and had followed their careers with close attention, so that the connection has remained between the University and the graduates in this branch of study. She will be greatly missed, but her work continues.

(7) REPORT OF THE DEAN OF THE FACULTY OF FORESTRY

(Dr. C. D. Howe)

The use of unemployed youth in forest work was inaugurated by the Dominion government three years ago on an equally sharing basis as to cost with the

provinces. It achieved varying degrees of success; it was the most successful in British Columbia and apparently the least so in Ontario. The project has been revamped and much enlarged through a greatly increased appropriation by the Dominion Parliament; it has even been given a new name, the National Forestry Program. This has naturally stimulated the demand for foresters. At the time of this writing the Dominion Forest Service and the Provincial Forestry Branch have engaged for the work seventeen graduates and undergraduates of the Faculty including the six members of this year's graduating class.

The continued state of uncertainty in political and industrial affairs has caused still further contraction in the pulp and paper industry and so has affected adversely the employment of foresters. In addition to this the failure of one company caused five of our graduates to lose their positions. None of this year's graduates but ten undergraduates have been employed by the pulp and paper companies this spring, all but one of the latter by the Spruce Falls Power & Paper Company, Limited at Kapuskasing.

The six men of the graduating class have been employed as mentioned above. Of the twenty-seven undergraduates, the pulp and paper industry is employing the largest number with ten, next the Provincial Government with nine and the Dominion Forest Service with three. One man is employed by the Department of Agriculture in Saskatchewan and one by a boys' recreation camp. The three remaining undergraduates, first year men, are employed although not in definite forestry work.

About twenty years ago an epidemic of the spruce budworm destroyed many million cords of potential pulpwood supplies in eastern Canada. Now another insect pest, the spruce sawfly is assuming epidemic proportions in lower Quebec and the Maritimes and is spreading westward very rapidly. Although the life history of the spruce budworm was carefully studied by government entomologists, they did not succeed at that time in arousing governmental interest in preventive measures. Fortunately the attitude of public opinion and hence of the government has grown increasingly sensitive to the alarming economic aspects of forest devastation, particularly in the last decade, so the present insect invasion is being met with energetic and well planned combative forces, in the beginning chiefly at the instigation of the Woodlands Section of the Canadian Pulp and Paper Association but now with the earnest coöperation of the limit holders and all the forestry organisations. The research work and the planning of the attack are being carried on by the Entomological Branch of the Dominion Department of Agriculture. A laboratory for the breeding of parasites has been established at Belleville, Ontario, and from it around a hundred million insect parasites have been distributed in the areas affected by the spruce sawfly. It is too early as yet to forecast the results but the greater portion of the several species of parasites used has been introduced from Europe where they keep the same species of sawfly, or one closely related to it, in check.

As a result of the enormous losses of pulpwood by insect pests, and their induced diseases, and the likelihood that they may recur periodically, the foresters are convinced that an insect protective service should be established by each provincial government, not as a separate service, however, but joined with the fire protection service. This would involve training fire rangers for the purpose. As in the case of fires insect attacks should be nipped in the bud before they get out of control. The development of really effective forest fire protection is based on a thorough investigation of the inducing conditions and careful research into the basic causes, so an insect protective service to be successful would need a corps of trained specialists. It is one of the functions of a forestry school to prepare men for such work and we have already done so by encouraging students to spend from two to four years in graduate work after obtaining their bachelor's degree. Lately, however, considerable pressure has been brought to bear on us to divide for certain students the present undergraduate course in the middle and to devote the last two years to developing specialists in forest entomology.

We have resisted that pressure because we do not believe the proposed method would produce men as well trained as our present procedure, that is, through graduate work after leaving the Faculty. Three of our men who did their graduate work in this and other universities are making very creditable contributions to our knowledge of forest insects.

(8) REPORT OF THE DEAN OF THE FACULTY OF MUSIC

(Sir Ernest MacMillan)

During the year 1938-39 the number of students registered for the Mus.B. degree was fifty-five. Ten of these were registered in the first year, nineteen in the second, and twenty-six in the third. The degree of Bachelor of Music was conferred on seven students; the degree of Doctor of Music was conferred on one student. Coördination between the University and the Conservatory Lecture Courses has enabled students in the Faculty of Music to be offered a number of extended courses of twenty-five lectures each, instead of the usual courses given in previous years.

The number of students registered in the music course in the Faculty of Arts was nine in the first year and five in the second. All lectures and tutorial classes in this course have been given by Professor Healey Willan and Professor Leo Smith. The course appears to be working satisfactorily on the lines originally planned.

Seven organ recitals were given in Convocation Hall—five by Professor Willan, university organist, and one each by Dr. Charles Peaker, and Mr. John Weatherseed of Montreal.

Musical activities in Hart House, although not lying within the province of this Faculty, are always followed with great interest. The usual Sunday evening and Friday afternoon series of concerts have been well attended and one notes with interest the progress made by the Hart House Glee Club, under the direction of Dr. Charles Peaker.

Mr. J. L. Richardson's Carillon Recitals from the Memorial Tower continue to interest large numbers of the public and contribute greatly to the enjoyment of open air university functions such as those at Convocation and on Armistice Day.

The Conservatory Choir gave its annual performance of Bach's "St. Matthew Passion" on April 4, and on December 27 sang Parts I and II of Bach's "Christmas Oratorio". The latter work was broadcast over the C.B.C. National Network.

The Conservatory Orchestra, under the direction of Mr. Ettore Mazzoleni, has had an exceptionally active season, appearing twice in Convocation Hall and twice in Massey Hall and presenting most enterprising programmes.

Concerts given by the Conservatory String Quartet have been well attended and the Chamber Music Club organised a year ago under the auspices of the Quartet has developed into an important feature in our student life.

The success of the Summer School held in July, 1938, at the Conservatory, has encouraged expansion and a more ambitious scheme for the present year has been planned. This involves the engagement of three teachers of international standing and an extension of last year's scheme of lecture courses.

The appointment of Mr. W. Kenneth Gibb, B.Com., as Secretary-Treasurer of the Conservatory is welcome as adding to the strength of the administrative staff of the institution.

At the end of May, 1939, registration for tuition at the Toronto Conservatory of Music showed an increase of one hundred and forty-five over that of the previous year. The number of candidates for examinations for the present season has been 13,608—as compared with 13,482 for the season 1937-38.

(9) REPORT OF THE DEAN OF THE SCHOOL OF GRADUATE STUDIES

(Professor G. S. Brett)

The number of students registered in the School of Graduate Studies for the year 1938-9 was 565. As the number enrolled in 1937-8 was 583, this figure indicates a decrease of 18. The number registered for the Ph.D. was 134, an increase of 16 as compared with the record for 1937-8. For the M.A. the number registered was 177, an increase of 4. The number of students enrolled as graduate students only dropped from 205 to 145. The decrease in the grand total appears to be due to the decrease in this class: if the decrease is due to the fact that the fees have been raised, it is reasonable to suppose that the higher fees tended to eliminate some of those who were not competent or were not concerned to complete the work for a degree. The number of men enrolled was 430, a decrease of 2 as compared with the previous year: the number of women dropped from 151 to 135, equivalent to the number reported in 1937.

The number of students resident in Toronto was 243; the number from the Province of Ontario (excluding Toronto) was 149. In both cases there was a decrease, namely 16 in the case of students from Toronto and 13 in the case of students from other parts of Ontario. The difference in the totals for 1937-8 and 1938-9 was a decrease from 421 to 392. [For detailed distribution see Appendix B (k)]. The number of students from other Provinces of Canada was as follows:—Manitoba 24, Saskatchewan 24, Nova Scotia 23, Alberta 17, British Columbia 15, New Brunswick 12, Quebec 7. These figures are normal and indicate a distribution which does not vary to any significant extent from year to year. The number from the United States increased from 32 to 36: the total from other countries was 15.

The number of institutions represented in the School was 60. The distribution was as follows:—Canadian 16, British 7 (including India, 2), China 5, Germany 1, Austria 1, Copenhagen 1, United States 29. The number of students from Universities in Ontario other than Toronto was 98, including 37 from Queen's, 34 from McMaster, 27 from Western Ontario. The number of students who took their first degree at Toronto was 301. It may be useful in this context to draw attention to the relatively large number of fellowships, scholarships and other emoluments which are annually granted in the United States to students from Toronto. As a result many good students leave this University because they cannot otherwise obtain funds to enable them to continue their studies. This is a matter for regret to some extent, but definite advantages accrue from wider experience, and the generosity of the institutions willing to extend their facilities to students from Canada deserves proper recognition.

The distribution of the candidates for the different degrees was as follows:—

Ph.D.	134
M.A.	177
M.Com.	1
M.S.	3
M.A.Sc.	24
E.E.	1
Mech.E.	2
D.Paed.	55
M.Sc.F.	1
M.Sc.(Dent.)	4
M.S.A.	12
Mus. Doc.	4

The distribution of the candidates according to the major subject was:—Anatomy 3, anthropology 3, applied mathematics 3, astronomy 1, biochemistry 16, biology 33, botany 21, chemistry 41, chemical engineering 15, Chinese archaeology 3, civil engineering 4, classics 17, dentistry 4, educational theory 1,

electrical engineering 1, English 52, food chemistry 1, forestry 2, geography 2, geology 17, germanic languages 6, history 22, household science 4, law 4, mathematics 11, mechanical engineering 5, metallurgical engineering 2, mineralogy 2, mining engineering 2, music 4, pathological chemistry 3, pedagogy 55, pharmacology 3, philosophy 49, physics 32, physiology 9, physiological hygiene 3, political science 22, preventive dentistry 1, psychiatry 1, psychology 39, romance languages 24, surgery 3.

The number of students recommended for degrees was:—

Ph.D.	32
M.A.	105
M.Com.	1
M.S.	3
M.A.Sc.	12
M.E.	2
D.Paed.	3
Mus. Doc.	1
M.S.A.	2

Fellowships:—The fellowships and scholarships named below were awarded by the Council of the School on the recommendation of the scholarship committee and the other committees of award:—

Open Fellowships:—

W. R. Butler, B.A. British Columbia, department of English.

L. D. Armstrong, B.A. Saskatchewan, department of physics.

Reuben Wells Leonard Fellowships:—

Miss M. H. Herriot, B.A. Manitoba, department of history.

Miss F. M. MacLeod, M.A. Alberta, department of English.

Miss A. D. Britton, B.A. Toronto, department of biochemistry.

M. F. Welsh, B.Sc. British Columbia, department of botany.

G. M. Neal, M.A. British Columbia, department of biology.

D. V. Wade, B.A. Western Ontario, department of philosophy.

Alexander Mackenzie Fellowships:—

D. Spring, B.A. Toronto, department of history.

A. S. Abell, B.A. Alberta, department of political science.

Ramsay Wright Scholarship:—

A. Wilkes, M.S.A. Toronto.

George Paxton Young Fellowship:—

S. Dillick, M.A. Toronto.

War Memorial Fellowships:—

B. J. Beveridge, B.A. Toronto.

A. E. McWha, B.A. Western Ontario.

Maurice Cody Fellowship:—

J. H. Aitchison, B.A. Saskatchewan, B.Sc. London.

Staff Appointments: The number of graduate students holding positions as demonstrators or instructors during the session 1938-9 was 181.

(10) REPORT OF THE DEAN OF THE FACULTY OF DENTISTRY

(Arnold D. Mason, D.D.S.)

One of the difficulties of teaching in the professional faculties is the correlation of the basic sciences to the subjects more closely related to practice. In this Faculty we endeavor to maintain good co-ordination of the teaching of the subjects in the various departments so that the student receives a clear conception of the relation of the fundamental and practical subjects. This principle in teaching was the salient feature of the meeting of the American Association of Dental Schools held at Cleveland, March 20th to 22nd. Drs. F. M. Lott, R. G. Ellis, L. Kilburn, R. J. Godfrey and myself attended. Papers were read

on administration, plans for improving the teaching of the clinical application of the basic sciences, methods of grading students, as well as on the responsibilities of dental education in the development of a national health programme. I believe that the teaching by the members of the Faculty is improved and their enthusiasm rekindled as a result of these conferences.

Last year the Faculty sustained a great loss in the passing of Dr. W. G. Switzer, associate professor in dentistry. He was much appreciated by the students for his ability as a clinical teacher in prosthetic dentistry as well as being liked personally for his sympathetic qualities. Although his health did not permit him to return last fall, other members of the staff were pleased to carry out his duties and we were grateful for their co-operation. It was accomplished at considerable personal sacrifice but without additional salary expense.

About two months after Dr. Switzer's death on October 23rd, 1938, Dr. R. S. Woollatt was appointed to succeed him and devote his entire time to teaching. Dr. R. L. Twible, associate in dentistry, was moved from his duties in the senior laboratory to the prosthetic department in the Infirmary, while Dr. C. G. Pearson was appointed demonstrator in the senior laboratory.

Owing to the resignation of Dr. D. M. Tanner, associate in the department of periodontology, Dr. W. G. McIntosh was appointed demonstrator in this subject.

In the department of medicine, Professor Duncan Graham, made arrangements to have the students of the fourth year taught the principles of medicine at the Toronto General Hospital as a groundwork for their lectures in the fifth year by Dr. F. A. Clarkson. Dr. Wallace Graham took charge of this instruction.

The following members of the staff were promoted last June from associates to associate professors of their respective subjects: Dr. L. F. Krueger, dentistry; Dr. J. H. Johnson, dental surgery and anaesthesia; Dr. C. H. M. Williams, periodontology.

The Faculty has been fortunate this year in the matter of scholarships and prizes for our students. The appeal to the graduates for funds to commemorate the lives of Deans A. E. Webster and Wallace Seccombe resulted in a generous response. A total of $4,000. was received for this purpose. The interest on this amount will be available for two scholarships for fifth year dental students, to be known as the Wallace Seccombe Memorial Scholarship and the Albert E. Webster Memorial Scholarship. The Oral Health dental journal donated three prizes for fifth year students: The Wallace Seccombe Prize for General Proficiency of the value of $150., and two Oral Health Theses Prizes of the value of $100. and $50. Through contributions of the Faculty and students the W. George Switzer Memorial Award was established for merit in prosthetic dentistry.

The total enrolment of dental students was 231, which was an increase of 44 over the previous year. Forty-eight members of the graduating class received the degree of Doctor of Dental Surgery, and of this number, 14 who were from other parts of the Empire and elsewhere, will return to their own countries. Of the 15 young women in the course in dental nursing, 11 received diplomas.

Twenty-two members of the staff gave lecture-clinics to various dental societies in many parts of the province. Places as far distant as Fort William and Timmins in Northern Ontario were included, as well as Ottawa in the east and Windsor in the west. In this way the latest thought in dentistry is carried to the practitioner and thus dental health service to the people of the province is greatly improved. This extramural service is made possible through the generosity of the Board of the Royal College of Dental Surgeons augmenting the appropriation of the University.

Over a period of years experiments with various methods of conducting post-graduate courses for practitioners have been tried. The best plan at the present time seems to be to make the necessary arrangements as the individual demand arises rather than announcing in advance organised courses. During the past year one graduate practising in Toronto attended once a week for ten

weeks studying ceramics. Three graduates practising elsewhere in Ontario attended for a two weeks' course in orthodontia. Two practitioners from the State of New York remained for one week studying periodontology.

The Department of Health of the Ontario Government requested that a course in complete denture prosthesis be arranged for the dentists giving service in the Ontario hospitals. Ten men took this instruction which was concentrated into one week.

These courses were all self-sustaining and were very much appreciated by those attending.

It is very gratifying that our recent graduates are finding a need for their services and we believe that their future looks full of promise.

(11) REPORT OF THE DIRECTOR OF THE SCHOOL OF HYGIENE

(R. D. Defries, M.D., D.P.H., Acting Director)

In the temporary absence of Dr. J. G. FitzGerald through illness, it is my privilege to present the twelfth annual report of the School of Hygiene relating to the academic session 1938-39.

The School of Hygiene was established in the University of Toronto through the munificence of the Rockefeller Foundation for the purpose of providing graduate instruction in public health for physicians and to co-operate in the training of public health nurses and public health engineers. Post-graduate instruction in public health for physicians who desire to assume responsibilities as medical officers of health or other important positions in health organisations was first given in this university in 1912. Since that time, the course leading to the Diploma in Public Health has been continuously offered by the Faculty of Medicine. It will be recalled that provision for the training of public health nurses was first made in the University in 1921 by the creation of the Department of Public Health Nursing. The work of the original department has been greatly extended and provision is now made for instruction in public health nursing in the School of Nursing.

It is gratifying to record that this year the first formal course was given in public health engineering. With the co-operation of the School of Hygiene, the Department of Biology of the university, and the Department of Health of Ontario, the Faculty of Applied Science and Engineering provided a course of post-graduate instruction in public health engineering for graduates in civil engineering of approved universities. The course is designed to qualify engineers for appointments made by public health authorities, by sanitary engineering divisions of departments of works, and by industries engaged in the supplying or manufacturing of food products. By making available the facilities of the Stanley Park Experimental Station, the Ontario Department of Health has provided a valuable field laboratory for the study of problems in sanitation. Although instruction had been given to post-graduate students in engineering, no formal course had been previously offered. With this provision, facilities are now available in the University of Toronto for the adequate training of public health personnel, including physicians, engineers, and nurses. Facilities are also provided to suitably qualified candidates desirous of obtaining special training in vital statistics and in public health laboratory work. The provision of these facilities has been appreciated by several of the provincial departments of health in the training of their personnel.

During the year, seventeen candidates took the course leading to the Diploma in Public Health. Three were from British Columbia, one from Manitoba, four from Ontario, six from Quebec, one from New Brunswick, one from Prince Edward Island, and one from Alaska. The total number of candidates who have received the Diploma in Public Health since the inception of the course in 1912

is 198. It is of interest to record that 143 are engaged in public health work in Canada, 12 in the United States, and 13 in other countries. Of the remainder, 16 are deceased or retired.

The departments of the School of Hygiene provided opportunities for graduate students proceeding to higher degrees and also provided instruction to undergraduate students. The following summary presents the number of students receiving instruction in the departments of the School of Hygiene.

SUMMARY OF STUDENTS RECEIVING INSTRUCTION IN THE SCHOOL OF HYGIENE, SESSION 1938-1939

A.	*Graduates*	
	Candidates for Diploma in Public Health	17
	Candidates for degree of Ph.D	3
	Candidates for degree of M.A	2
	Candidates for degree of M.A.Sc	2
B.	School of Nursing	68
C.	*Undergraduates*	
	Faculty of Medicine, 5th year	133
	Faculty of Household Science, 2nd and 3rd years	26
	Faculty of Arts, 2nd, 3rd, and 4th years	72
	Second-year Pharmacy	118
		441

The Hastings Memorial Fellowship was established in 1929 as a memorial to the life and work of the late Dr. Charles J. O. Hastings, medical officer of health of the city of Toronto from 1910-1929. It is awarded every three years and was granted in 1938 to Dr. L. E. Ranta. The purpose of the fellowship is to further original investigations in the field of preventive medicine and valuable contributions have been made by the recipients.

The provision of fellowships in public health by the Rockefeller Foundation and by the Connaught Laboratories has been an important factor in making possible this large group of trained medical personnel in Canada. Without the assistance of such fellowships, only a small number of those who have had the opportunity of taking the course could have taken such post-graduate work. The importance of the contributions made by the School of Hygiene in the training of physicians in public health cannot be over-estimated. It is recognised today that trained public health personnel are absolutely essential if further advances are to be made in improving and safeguarding the health of the public.

The obtaining of post-graduate training offers a serious problem to many physicians, particularly those who are graduates of a few years' standing and who are serving as part-time health officers. The importance of the office of health officer is being increasingly recognised and qualifications for this appointment are being carefully considered by departments of health. In Ontario, the Department of Health is establishing qualifications and in this connection the Minister of Health requested the School of Hygiene to consider how facilities might most effectively be provided for the training of health officers. This matter is being thoroughly studied.

To facilitate the attendance of part-time health officers at the course leading to the Diploma in Public Health, the instruction has been arranged in four terms, each of approximately eight weeks. Consideration is being given to the provision of facilities for employed health officers for observing the methods in modern public health administration and for obtaining suitable field experience. In this connection, it is hoped that it may be possible to develop a field-training centre in association with the School of Hygiene. The Rockefeller Foundation has expressed its interest in this objective and in the plans which are being discussed for the training of part-time health officers.

Studies and investigations have been undertaken in the department of hygiene and preventive medicine and in the sub-department of chemistry in

relation to hygiene, as well as in the departments of epidemiology and biometrics, and physiological hygiene. The studies in the department of hygiene and preventive medicine have been presented by Dr. D. T. Fraser in his report to the Dean of the Faculty of Medicine. At the request of the Dominion Council of Health, the department of epidemiology and biometrics has undertaken to study the form and content of the statistical data as presented in the registrar-generals' reports of the various provinces, with the object of making recommendations. The department has also been asked to offer suggestions as to the statistical content of the reports of the various provincial departments of health. Details of studies conducted in the department of physiological hygiene under the direction of Dr. C. H. Best, in the sub-department of chemistry in relation to hygiene under the direction of Dr. P. J. Moloney, and in the department of epidemiology and biometrics under the direction of Dr. R. D. Defries are presented in the report of the Director of the Connaught Laboratories since these studies are made possible, in part, through grants from the Connaught Laboratories.

As in previous years, the School of Hygiene has had the opportunity of entertaining visitors for varying periods. They have come from Australia, China, Cuba, Dutch East Indies, Finland, India, Argentina, France, England, New Zealand, the United States of America, and the various provinces of Canada.

(12) REPORT OF THE LIBRARIAN

(W. S. Wallace, M.A.)

I beg to submit the following report on the work of the University Library for the year ending June 30, ~~1939.~~

The number of volumes added to the Library during the year has been ~~16,125~~, and the number of pamphlets ~~5,105~~; making the total number of accessioned volumes in the Library ~~368,280~~, and the total number of pamphlets ~~140,500~~—or a grand total of 508,780.

The following are the statistics of the use of the Library by undergraduates in comparison with previous years:

	1921-22	1926-27	1934-35	1937-38	1938-39
Reading-room books....	41,928	106,485	186,605	193,708	195,869
Over-night books.....	18,998	39,779	107,559	102,675	102,233
Week books.....	4,782	13,104	23,399	21,233	21,247
Totals.....	65,718	159,278	317,541	318,616	319,349

The following is a statement showing the circulation in the medical, political science, University College, and law reading-rooms during the year, in comparison with other years:

	1934-35	1935-36	1936-37	1937-38	1938-39
Medical reading-room					
Reading-room.....	10,761	11,195	12,814	11,333	12,145
Over-night.....	11,386	12,219	12,425	10,072	10,755
Week books.....	3,606	3,622	4,188	3,069	2,941
Totals.....	25,753	27,036	29,427	24,474	25,841
Political Science:					
Reading-room.....	12,567	11,208	9,088	8,956	10,158
Over-night.....	6,890	6,338	4,865	5,438	5,484
Totals.....	19,457	17,546	13,953	14,394	15,642
University College:					
Reading-room.....	33,325	30,746	30,992	28,310	27,275
Over-night.....	17,943	16,466	15,923	13,514	12,005
Week books.....	.....	.....	.....	593	649
Totals.....	51,268	47,212	46,915	42,417	39,929

Law reading-room:					
Reading-room	8,822	15,585	22,985	25,981	29,242
Over-night	2,870	4,368	4,004	4,302	4,657
Week books	251	524	373	499	442
Totals	11,943	20,477	27,362	30,782	34,321

The following is a statement showing the total circulation in the Library during recent years:

	1925-26	1934-35	1936-37	1937-38	1938-39
To undergraduates	159,278	317,541	341,086	318,616	319,349
To professors and graduates	20,000	40,843	39,437	41,607	41,439
Totals	179,278	358,384	380,523	360,223	360,788

It will be seen from these figures that the total circulation of the University Library during the past year has been practically the same as the year before. A decrease in the circulation in the University College reading-room, which is difficult to explain, has been more than counterbalanced by the increase in the circulation in the law reading-room.

These figures, it should be explained, are exclusive of books taken for consultation from the reference shelves, of which 29,268 have been replaced by the library assistants in the main library, during the past year; and of course they take no account of the very considerable circulation of books in some of the departmental libraries.

The number of interlibrary loans has also remained about the same. During the year the library handled 850 interlibrary loans, as against 851 last year: 531 of these books being lent, and 319 being borrowed.

During the past year the binding and mending department has prepared for binding 3,455 volumes, mended 2,745 volumes, and placed in pamphlet binders or boards 978 volumes. During the year there were filed in the depository set of Library of Congress cards a total of 128,475 cards.

The death of Miss Hester Young, the reference librarian, on November 23, 1938, removed from the staff of the University Library one of its oldest members. Miss Young, who was at the time of her death on a year's leave of absence pending retirement on pension, had served in the library for thirty-five years, first as chief cataloguer, and latterly as reference librarian; and it is a matter of regret that she should have lived such a short time to enjoy the well-earned leisure of retirement. I should also note the retirement on pension last July of Miss Alice Stennett, who has been a member of the cataloguing staff of this library since 1916, after having served for several years with the New York Public Library and McGill University Library.

The retirement, followed by the death, of Miss Young has made necessary a readjustment of the reference work in the Library. The post of reference librarian has been discontinued, and the reference work has been placed in charge of the head of the circulation department. The circulation department has been strengthened to enable it to handle reference work. It is indeed, in a university library, so difficult to draw the line between circulation and reference work, that it would seem best to have them handled by one department. It is hoped that the library will thus be enabled to offer a reference service of increasing value to the University.

In addition to its ordinary work, the circulation department has continued its preparation of the *Canadian periodical index*, and the first cumulated volume, that for 1938, has now made its appearance. Ample testimony has reached us as to the usefulness of the *Canadian periodical index*. In making the contents of Canadian periodicals more readily available, it is performing a valuable service, not only to libraries in general, but also to Canadian literature in particular.

Among several gifts and bequests received by the Library during the year, especial mention must be made of the very generous and valuable gift made by

Professor Lash Miller of the collection of books and periodicals in chemistry which he had built up during his long and distinguished service in the University. This collection, which comprised nearly 3,000 volumes, many of them difficult or impossible to secure, has now been accessioned and catalogued, and has been transferred to the chemical building as a departmental library in chemistry. Professor Lash Miller has kindly undertaken to continue to supply the current volumes of most of the periodicals in the collection, but the University has undertaken to bind them and in general to keep the collection up to date.

In conclusion, I should like to be allowed to repeat what I have said in previous reports, namely that it is most desirable that the University should now make plans either for extending the present library building, or for building a new and modern university library building in the near future. The stack-room of the library is now filled to over-flowing; and if all the books that are out in the possession of individual borrowers were returned, we should not be able to find room for them on the shelves. It has already become necessary to withdraw from circulation and place in storage certain periodicals which are in only occasional use; but even in the library building space for storage is practically exhausted, and it is becoming necessary for us to store some of the university library books in the cellars of University College and other buildings. Under such congested conditions, the administration of the University Library becomes increasingly difficult, and I have nothing but the highest praise for the way in which my assistants have carried on the work of the library under these conditions.

(13) REPORT ON RESEARCH

Anatomy, under direction of Professor J. C. B. Grant

Professor J. C. Watt has been engaged in translating and editing the second and third volumes of the new edition of Sobotta's *Atlas of Human Anatomy*. The late Professor J. P. McMurrich had completed this work on the first volume.

Professor W. H. Piersol has completed the study of a very early and very rare human embryo in which only three pairs of somites have been developed. His report on this embryo is being published as one of the University of Toronto studies.

Dr. C. G. Smith has continued his investigation on the regeneration of sensory olfactory epithelium; his previous work on this subject was on the rat. This time it is on the frog. He finds that both the primary olfactory sensory neurons and the supporting elements regenerate.

Dr. R. K. George has made a study of the valves in the spermatic veins.

The head of the department has been engaged in preparing a second edition of his text-book, and in collaboration with Dr. H. A. Cates has written a companion to this book for use in the laboratory. In all of this he has had the assistance of Dr. R. K. George.

Mr. H. E. LeMasurier, in collaboration with Dr. Branion of the poultry department of the Ontario Agricultural College, has made the following three investigations on the nutrition and growth of the fowl up to six weeks of age and has reported on them: (1) A radiological study of the development of the fowl on a mineral deficient ration. (2) The relation of the mineral supplement consumption to the normal skeletal development as judged by X-ray examination of various breeds of fowl. (3) Some observations on the skeletal development of the fowl. In further collaboration with Dr. Branion he has made observations on unabsorbed yolk in chicks and on the place of oyster shell in the ration of the fowl.

Directed by Dr. A. W. Ham

Dr. K. Baldwin, working under a grant from the Banting Research Foundation, has studied the development of the lung. She has shown that near the

end of foetal development the lining cells of the alveoli separate—instead of becoming stretched into a thin membrane as is commonly believed—and therefore that postnatal alveolar walls are not covered with epithelium.

Miss M. G. Chapman, also working under a grant from the Banting Research Foundation, has shown that rat endometrium will grow in vitro with embryonic extract, and that oestrogens in cultures do not replace the growth stimulating effects of embryonic extract, even though they induce marked growth of this tissue in vivo. (This work is being carried out in an attempt to gain more fundamental information regarding normal and pathological cell growth).

Miss Vera Ryder has, throughout the year, obtained a considerable amount of human and animal specimens with a view to determining how bones continue to grow in girth at the site of attachment of tendons.

Dr. Ham has performed further experiments related to the production of disease of the coronary artery, nephritis and periarthritis nodosa by upsetting the calcium and phosphorus metabolism. Through the courtesy of Dr. Best, the tissues of many animals shown to be diabetogenic, following the injection of pituitary extracts, were made available for histological study. This study is being performed by Dr. Ham of this department and Dr. Haist of the department of physiology. It is yielding much information regarding the action of the extract on tissues as well as revealing the progressive histological changes that occur in the pancreas. Further work was carried out this year with Drs. Tisdall, Drake and Robertson of the department of paediatrics in connection with diet and the parathyroid glands. This and former work has established the fact that rickets is not necessarily associated with parathyroid hypertrophy; that the latter develops as a result of hypocalcaemia and that neither hypo- nor hyperphosphataemia causes parathyroid hypertrophy in the absence of hypocalcaemia.

Applied Mathematics, under direction of Professor J. L. Synge

G. E. Hay, M.A.: The general theory of the periodontal membrane developed during 1937-38 has now been used to plot those regions in the membrane in which the pressure due to various types of loading exceeds the pressure in the capillaries. The method of development in powers of a small parameter has been applied to give a systematic treatment of the bending of thin rods. These investigations have been carried out under a studentship of the National Research Council of Canada.

L. Infeld, Ph.D.: The equations of motion in general relativity theory have been developed for the case where coordinate conditions are not assumed and matter is treated as singularities in the field.

A. F. Stevenson, Ph.D.: A method previously given for the approximate calculation of energies of atoms containing two valence electrons has now been improved and simplified, and an application made to the case of doubly-ionized oxygen.

J. L. Synge, Sc.D.: The theory of the Schmidt reflecting telescope has been developed by direct Hamiltonian methods.

P. R. Wallace, M.A.: The equations of motion of charged particles have been obtained from the equations of the electromagnetic and gravitational fields in general relativity.

Astronomy, under direction of Professor R. K. Young

General Programme

The major programme of work on the determination of the radial velocities of a selected list of stars in regions 4 x 4 degrees square centered at the Kapteyn areas, begun with the opening of the observatory in 1935, has been completed and the results published. There were 500 stars on this list. The total number of stars whose radial velocities have been determined at the various observatories

of the world totals approximately 9000. Considerable progress has also been made on two further lists of stars whose velocities are at present unknown. The one list extends the limits of the regions to an area 6 x 6 degrees square and the other list includes all stars brighter than visual magnitude 6.00 north of declination −10 degrees. In the completion of the original programme and on these further programmes 1200 plates have been secured. The measurement and reduction of these plates for radial velocity has been kept well up to observation so that at present there are less than 100 plates to measure. During the year 1153 measures were made: Mr. Tidy, 782; Miss Northcott, 173; Dr. Heard, 90; Mr. Bunker, 82; Dr. Millman, 13; Dr. Hogg, 13.

J. F. Heard, Ph.D.: Co-operated in the general radial velocity programme and began observation of a number of emission line B type stars to study the intensity and changes in the spectra. Observation has also been continued on the binaries H.D. 9312 and 96528 and the spectrum of Gamma Cassiopeiae. The spectrum of *i* Herculis was investigated for supposed radial velocity and spectral variations.

F. S. Hogg, Ph.D.: Co-operated in the general radial velocity programme and continued observation of the binary stars H.D. 34762, 63630, 106677, 172187, 183794, 206155. A number of photographs were obtained of planetary nebulae with a series of colour filters to determine the magnitudes of the central stars, for distance estimates; the colours, for temperatures. Dr. Hogg has continued to act as assistant editor of the Journal of the Royal Astronomical Society of Canada.

Mrs. Helen S. Hogg, Ph.D.: Continued observation of globular star clusters for the study of the variables contained therein. At the Newtonian focus of the 74-inch telescope 103 plates were secured. A general catalogue of all variables known in globular clusters has been prepared and published. This catalogue revealed the fact that a very promising field of work existed in a number of clusters centered around declination −25°. To prosecute this work Mrs. Hogg obtained a grant from the National Academy of Sciences and during May and June of this year at the Tucson Observatory in Arizona obtained 275 photographs of clusters. Examination of these plates in the coming year should add greatly to our knowledge of the variables in the clusters of this part of the sky.

P. M. Millman, Ph.D.: Co-operated in the general radial velocity programme and when opportunity offered continued observation of faint eclipsing binaries. The surface features of Mars were studied to test the relative intensity of the light in the various markings on the planet's surface. Co-operative observational programmes were planned for the δ Aquarids, Perseids, Orionids, Leonids and Geminids. Poor weather was encountered in the majority of cases. Approximately 1200 meteors were visually recorded at the D.D.O. and co-operating stations. At the Dunlap Observatory six meteors were photographed with direct cameras in a total exposure of 20 hours; no spectra were secured, total exposure 39 hours. At co-operating stations 11 direct photographs were secured in a total exposure time of 122 hours. Data were collected on 25 fireballs.

Department of Biochemistry, under direction of Professor H. Wasteneys

Directed by Professor Wasteneys:

Mr. B. F. Crocker and Dr. Paul Hamilton have been engaged in the elaboration of methods for determining with the necessary accuracy small quantities of deuterium which they propose to use for tracing the progress of ingested protein nitrogen in the animal body. They have succeeded in doing this and they have commenced the investigations rendered possible by this accomplishment.

Dr. H. B. Collier has continued his researches on the synthesis of proteins by papain and pepsin. He has obtained further proof of their synthetic activity and has studied some of the mechanisms involved in the syntheses as well as of the hydrolyses accomplished by these enzymes.

Directed by Professor Marrian:

Mr. E. A. Ryan has developed methods for the isolation of a compound of unknown constitution (compound X) from normal male urine and has determined some of its properties. He has isolated and identified three steroid compounds from this urine; the presence of two of these may help to elucidate steroid metabolism. He is now investigating a more exact method for the isolation of these compounds.

Dr. B. Schachter has succeeded in isolating a new crystalline conjugated compound from pregnant mares' urine. This compound he has shown to be none of the known conjugated oestrogens and he has spent considerable time in an attempt to determine its structure. He has ascertained however that the excretion of the new steroid conjugate in the urine of pregnant mares follows a course similar to that which he had previously determined for a known conjugated oestrogen.

Dr. W. H. Fishman has been engaged in studies of the action of the enzyme β-glucuronidase which he has obtained in the form of purified extracts of ox spleen. He has studied conditions for the action of this enzyme on various substrates. He has discovered that by feeding large doses of menthol and borneol to dogs and mice there is a definite increase in the β-glucuronidase activity in various tissues of these animals. Since the formation of glucuronides is a well known mechanism for the detoxication of poison in the body, this observation is of importance for the light it may throw on detoxicating mechanisms in general. He has also performed experiments which show that the formation of oestriol glucuronide is influenced by β-glucuronidase and that the site of this formation is the sex organs and not the liver.

Dr. A. D. Odell has been engaged in an attempt to study the metabolism and structure of pregnane triol. He obtained a good supply of this substance from the concentrate of the neutral fraction of twenty-five thousand gallons of mares' urine.

Mrs. Edith B. Anderson has completed her investigation of the chemical constitution of equol, an optically active dihydroxyphenol isolated by Marrian and Haslewood in 1932 from the urine of pregnant mares. Mrs. Anderson has identified this compound as 7-hydroxy-3-(4'-hydroxyphenyl) chroman and has succeeded in synthesizing racemic equol methyl ether.

Dr. G. F. Marrian was engaged in the study of the optical activity of compounds he had prepared during his study of equol.

Directed by Professor A. M. Wynne:

Mr. M. Freed has continued his investigation, interrupted two years ago, of the synthesis of glycerides of oleic acid by pancreatic lipase. He has studied certain aspects of the kinetics of the synthetic process, particularly in relation to variations in the concentration of oleic acid and to the activating effects of bile salts.

Miss E. Macpherson has continued the investigation of methods of purifying pancreatic lipase for use in investigations into its synthetic action.

Mr. F. L. Root has been engaged in a study of the growth of *C. diphtheriae* in synthetic and other culture media, in relation to toxin production. His investigations have been greatly facilitated by the kind co-operation and helpful advice of Dr. E. M. Taylor and Dr. P. J. Moloney of the Connaught Laboratories.

Mr. J. Spizizen has been engaged in a study of the energy of activation of the invertase-sucrose system of yeast.

Mr. J. Tuba continued his investigation of factors affecting the formation and properties of yeast phosphatase.

Dr. A. M. Wynne, in co-operation with H. Z. Sable and J. P. Harshman, has recently undertaken an investigation of some of the factors influencing the formation and activity of phosphatase in the intestinal mucosa. It is hoped that

the results of the investigation may help to explain the function of the enzyme in its relation to the absorption of fatty acids and of sugars from the intestinal tract. This work is supported by a grant to Mr. Sable, made by the Banting Research Foundation.

Biology, under direction of Professor E. M. Walker

The following summary includes investigations in progress, published or in course of publication, for the year 1938-39:

Vertebrate Anatomy

By Professor W. H. T. Baillie—Bilateral eye movements in vertebrates as related to vision and primitive reaction patterns; the blood circulation through the heart of the frog; metamerism in Amphibians.

Invertebrate Zoology (including entomology)

By Professor E. M. Walker—Abdominal sclerites and musculature of Grylloblatta; faunistic and distributional studies of Canadian Odonata.

Under the direction of Professor E. M. Walker:

Miss Jean C. Burnham—Anatomy of the Potato Aphid, *Myzus persicae*.

C. G. Bucher—Anatomy of *Monodontomerus dentipes*, a chalcid parasite of the pine sawfly *Diprion simile* (completed).

A. R. Graham—Ecology and biological control of the Larch Sawfly (*Lygaeonematus erichsonii*) and the larch casebearer (*Haploptilia laricella*).

G. M. Neal—Factors controlling the distribution of pelagic rotifers in British Columbia and Ontario.

H. H. J. Nesbitt—Anatomy of the nervous system of orthopteroid insects (completed).

R. W. Thompson—Influence of temperature, moisture and light upon the Red Spider (*Tetranychus tellarius* L).

H. B. Wressell—Effect of temperature on egg-laying in the European Corn Borer.

By Dr. F. P. Ide—Gynandromorphs in mayflies (in collaboration with Dr. H. T. Spieth of the City College of New York); distribution of mayflies in the Credit River and Ottawa River (completed); life histories of various species of sawflies of the genus Neodiprion in conifers; census of insects emerging from the forest floor by the method employed in stream work.

Marine Biology

By Professor A. G. Huntsman—Factors determining entrance into, and ascent of, rivers by salmon.

Under the direction of Professor A. G. Huntsman:

P. F. Elson—Factors determining movements of trout into brooks.

C. J. Kerswill—The life history of the quahaug, (*Venus mercenaria*) and the factors influencing its growth and distribution.

H. M. Rogers—The estuary as a biological habitat with particular reference to the life of the smelt (*Osmerus mordax*).

Mr. H. C. White of the staff of the Atlantic Biological Station, St. Andrews, N.B., was given accommodation in the laboratory from January to April for study of the relation of fish-eating birds to the production of salmon smolts and of the factors determining descent of the smolts to the sea.

Vertebrate Embryology

Under the direction of Professor A. F. Coventry:

S. H. Chambers—Mechanism of withdrawal of the umbilical hernia of embryonic mammals and its relation to the final topography of the alimentary canal; differentiation in transplanted limbs in the chick with reference to the localisation of potencies in the limb-bud.

Miss A. M. Ironside—Study of the corpora lutea of *Peromyscus* with special reference to the correlation of the several generations of corpora lutea that are often found in the ovaries of this mouse, with the number, frequency and season of pregnancies.

Animal Bionomics, Mammalogy and Ichthyology

By Professor A. F. Coventry—Continuation of studies of population of small mammals in Ontario. Observations were made during 1938 at Toronto, in Algonquin Park and at Temagami. Analysis of the data now available is in progress.

By Professor J. R. Dymond—Taxonomy and distribution of the fishes of the Ottawa region and of the Northwest Territories of Canada.

Under the direction of Professor J. R. Dymond:

W. A. Kennedy—Whitefish of Algonquin Park.

W. R. Martin—Studies on the Arctic Char of northern Canada (completed).

D. G. Wilder—Relationship of land-locked or lake salmon to migratory Atlantic salmon.

Genetics and Human Biology

By Professor J. W. MacArthur—Cytogenetics of tomatoes; studies in size inheritance and selection of tomatoes; growth in weight and stature of twins and multiple birth sets.

By Professor J. W. MacArthur with Dr. W. E. Castle (University of California)—Linkage of the gene controlling hereditary jaundice in rats.

By Professor J. W. MacArthur with Dr. A. N. Langford—Development at Vineland of a commercial greenhouse tomato immune to brown mould.

Under the direction of Professor J. W. MacArthur:

L. Butler—Analysis of fruit size inheritance in the tomato (completed).

Miss V. Engelbert—Reproduction and cytogenetics of species of blue grass (Poa).

Mrs. F. H. Miller—Comparison of human hand and foot prints.

Mrs. M. Richardson—Intelligence quotients in social problem children and their sibs and parents (completed).

A. Wilkes—Causes of variations of sex ratio in parasitic Hymenoptera (*Microplectron*).

By Professor Norma Ford—Palmar patterns of the kindred of mongoloid patients (in co-operation with several Toronto and New York hospitals); determination of the extent of plantar syndactylism among Ontario families; study of two pairs of twins with pyloric stenosis; continuation of the study of the physical characters and X-ray photographs of the two sets of quintuplets loaned by the Royal College of Surgeons; investigation of the blood vascular system in the placentae of multiple births (in co-operation with four Toronto hospitals).

Under the direction of Professor Norma Ford:

Miss G. Workman—Palmar patterns in mongoloids and the occurrence of similar patterns in normal individuals (completed).

Comparative Neurology

By Professor E. H. Craigie—vascularity of the brain of *Ambystoma;* vascular connections of the hypophysis in the frog (completed); vascularity of the hypothalamus of the rat; blood vessels of the brain in the kangaroo and functional significance of the form of the capillary loops; preparation of material for the study of vascularisation of the brain in *Necturus, Alligator,* lizards, snakes and turtles; the cerebral cortex of *Rhea;* the cerebral cortex of *Tinamidae.*

Limnology (Ontario Fisheries Research Laboratory, directed by Professor W. J. K. Harkness)

Dr. F. E. J. Fry—The influence of carbon dioxide in the utilisation of oxygen by various species of fish.

Dr. F. E. J. Fry, assisted by W. A. Kennedy, J. S. Hart and J. R. Brett—Controlling factors in the movements, numbers and size of lake trout in the lakes of Algonquin Park.

By Professor W. J. K. Harkness—Ecology of trout lakes and streams in southern Ontario.

Dr. F. P. Ide, assisted by W. M. Sprules—Quantitative study of the insect fauna of the stream bottom in Costello Lake, Algonquin Park.

Dr. R. R. Langford and W. R. Martin, assisted by J. Spizizen—Movements, growth and feeding habits of yellow perch in Algonquin Park lakes.

R. B. Miller—Ecology of the Chironomidae of Costello Lake, Algonquin Park.

V. E. F. Solman—Distribution of zooplankton in Costello Creek, Algonquin Park.

Dr. D. A. Maclulich of the Department of Lands and Fisheries is investigating the distribution of parasites of trout in the Park. This investigation is being conducted in co-operation with the Ontario Fisheries Research Laboratory.

Dr. Charles Elton of the Bureau of Animal Population, Oxford University, visted the Laboratory during September.

Experimental Biology

By Professor K. C. Fisher—Effect of temperature on the critical oxygen tension of embryonic salmon; development of a spectrophotographic method for following the oxidation and reduction of cytochrome in intact yeast cells; setting up of the Warburg method for the observation of respiration in cells and organisms. (By using these techniques a more satisfactory interpretation has been evolved of such variations in the effect of cyanide on cell metabolism as occur upon the fertilisation of certain egg cells and which accompany diapause in insects).

By Professor K. C. Fisher in collaboration with Mr. Herman von Dach of the Ohio State University—Respiratory metabolism of the saprophytic protozoon, *Astasia klebsii.*

Under the direction of Professor K. C. Fisher:

C. W. J. Armstrong—Quantitative investigation of the effects of cyanide and azide on the heart rate of embryonic fish (completed).

K. Graham—Chemistry of respiration through the various developmental stages of the Codling moth.

Miss Rosemary Martin—A comparative study of the development of the external respiration in various organisms.

W. B. Stallworthy—Ecological significance of environmental factors such as temperature, humity and light, for land isopods (Oniscoidea).

Botany, under direction of Professor R. B. Thomson

I. Phanerogamic Botany and Genetics

Anatomy and Experimental Morphology

Bannan, M. W.—A study of the variations in wood structure in the native conifers and determination of the relationships between such variations and the ecological conditions under which the trees grow.

The wood structure of *Thuja* and *Libocedrus*.

Haldenby, C. N.—The origin and distribution of horizontal resin canals in the conifers.

Moore, Miss Ruth H.—The structure of the cone of *Equisetum*.

Thomson, R. B.—The comparative anatomy of the male and female cone scales of the conifers.

A mucilaginous layer in the pollen grain of the conifers and its connection with "wing" formation.

Thomson, R. B. & Hull, Miss Kathleen L.—The organisation of the sporeling of *Osmunda* and of the lower vascular plants.

Wright, Miss J. Gertrude—The nature of the pit-closing membrane in the higher gymnosperms.

Taxonomy

The total number of specimens identified, mounted, stamped, recorded and actually distributed in the herbarium during the year was 9,144. The total number of sheets in the Herbarium is now 47,701.

Krotkov, P.—Plant Survey work in the Bruce Peninsula; revision of the herbarium material; special study of Ontario willows and golden rods.

Taylor, T. M. C.—A critical study of the genus *Woodsia*.

Plant survey work in the Schreiber and Michipicoten areas, in co-operation with the National Museum of Canada. Reports dealing with the plants of these two areas are in course of preparation.

Genetics

Wright, Miss J. Gertrude—A study of abnormal types of *Linaria vulgaris* and their heredity.

II. Mycology, Forest Pathology and Cryptogamic Botany

(Under direction of Professor H. S. Jackson)

Cain, R. F.—A taxonomic study of Ontario Sordariaceae and related Sphaeriales.

Jackson, H. S.—The mycological flora of the Toronto region and of the Temagami Forest Reserve.

A taxonomic study of Thelephoraceae in Canada.

Lehmann, A. J. V.—A study of the nuclear phenomena of the germination of teliospores of certain species of *Lepto-Puccinia*.

Macrae, Miss Ruth—A study of phosphorescence in *Panus stipticus*.

Skolkó, A. J.—A cultural study of *Aleurodiscus*.

There have been 3,808 specimens added to the Mycological herbarium this year and the collection now totals 67,292.

During the year the accumulated collections of Bryophytes have been assembled and arranged. The herbarium of Bryophytes (Liverworts and Mosses now numbers 7,250.

III. Plant Ecology and Seed Studies

(Under direction of Professor H. B. Sifton)

Structural Ecology

Facey, Miss V.—Abscission of leaves in deciduous plants and evergreens.
Sifton, H. B.—Leaf development in Labrador Tea.
Watson, W. R.—Developmental studies of leaf structure as related to light.
Seed Studies
Hamly, D. H.—New apparatus for the investigation of light relationships in seeds.
Stereo-photomicrography of seeds.
McGugan, Miss J.—Identification of seeds and seedlings of the Genus *Brassica*.
Sifton, H. B.—Effects of temperature, light, water and oxygen supply on the germination of *Typha* seeds.

IV. Plant Physiology

(Under direction of Professor G. H. Duff)

Clendenning, K. A.—The metabolism of the tomato fruit in relation to its storage. Physiological and biochemical studies of the fruit during growth and storage have been continued in collaboration with the Ontario Agricultural College. Special acknowledgment is made of the financial support and facilities provided by the College for work during the summer.

Duff, G. H., & Forward, Miss Dorothy F.—The sugars of the wheat leaf, their concentration gradients and relation to cell heterogeneity in the leaf.
The rate of inversion of non-reducing reserve sugar as a determinant of metabolic activity.
The effect of temperature and oxygen tension upon the respiration of stored Ontario apples.

Ward, G. H.—Carbohydrate and protein metabolism of the tobacco leaf during growth and curing.

V. Plant Pathology

(Under direction of Professor D. L. Bailey)

Except where otherwise stated, these researches are being carried on in co-operation with the Vineland Horticultural Experiment Station.

Bailey, D. L.—Strawberry root-rot.
Disease of ornamentals.
(*a*) Cytospora disease of Koster's blue spruce.
(*b*) Suspected virus diseases of lilies and gladiolus.

Langford, A. N.—The development of a suitable greenhouse tomato resistant to *Cladosporium fulvum*.

Mead, H. M.—A co-operative study of some seed-borne disease of barley. In co-operation with the Dominion Plant Pathological Laboratory, St. Catharines.

Richardson, L. T.—Phytophthora stem-girdle of tomato.

Woolliams, G. E.—Fusarium wilt of Zinnia. In co-operation with the Dominion Plant Pathological Laboratory, Summerland, B.C.

VI. Cytology

(Under direction of Dr. L. C. Coleman)

Coleman, L. C.—The cytology of *Gasteria* and *Gasteria* X *Aloe* hybrids.
The cytology of *Veltheimia viridifolia*.

Gopalayengar, A. R.—The Cytology of *Scilla* species.
Hillary, B. B.—The Feulgen nucleal stain and its uses in Cytology (completed as Doctor's thesis).
Further improvements in rapid cytological technique (in press).
Hillary, B. B., & Coleman, L. C.—The Investigation of Chromosome Structure with the aid of the Feulgen nucleal stain.

Chemistry, under direction of Professor F. B. Kenrick

Forty-two students were engaged in research work during last winter under the direction of members of the staff of the department of chemistry.

The degree of Master of Arts was conferred on 9 of these, viz: Messrs. R. W. Allgood, H. D. Bett, A. W. Birnie, W. H. Brown, D. M. Burpee, I. G. Goddard, W. J. Hornibrook, L. T. Munn, W. A. Tidridge, also on Mr. A. M. Birks who worked under Professor Moloney in the Department of Hygiene.

The degree of Master of Science in Agriculture was conferred on Messrs. D. C. Hill, R. H. McNeill and I. R. Motzok who worked in the Ontario Agricultural College under the direction of Professor Ruhnke.

The degree of Doctor of Philosophy was conferred on Mr. M. Cohen whose research was done under Professor Kenrick and on Messrs. W. A. James, D. J. LeRoy and S. Shankman who worked under the direction of Professor Gordon.

An 1851 Exhibition Scholarship was awarded last summer to Dr. H. J. Bernstein, for research carried out under Professor Martin.

The following were the subjects of research:

R. W. Allgood, B.A.—The temperature coefficients of the transference numbers of potassium chloride.
G. E. Anderson—Adsorption of alcohol vapour on Pyrex glass.
E. B. Backman—Derivatives of glycolic aldehyde.
Prof. E. E. F. T. Baer—d- and l-glyceric aldehyde; d- and l-acetone glycerol and derivatives; oxidation by lead tetra-acetate.
Prof. F. E. Beamish—Specific reagents for the metals of the platinum group and for gold.
H. D. Bett, B.A.—The photochemical transformation of trans- to cis-di-paratoluyl ethylene.
A. W. Birnie, B.Sc.—Adsorption of water vapour on powdered fused silica.
J. C. Bond—Structure of hydrocellulose.
W. H. Brown, B.A.—The mercuration of styryl cyanide.
D. M. Burpee, B.A.—The extraction of gold from cyanide solutions.
Prof. J. T. Burt-Gerrans—Electrolysis with alternating current.
A. A. Cartenuto—Friedel and Crafts reaction.
M. Cohen, M.A.—Adsorption of water vapour on plane fused quartz surfaces.
I. B. Cushing—Preparation of optically active glycerides and β-glycerophosphates.
D. C. Downing, B.A.—Studies on organo-metallic compounds.
Miss E. V. Eastcott, Ph.D.—See Dr. Rae.
Prof. J. B. Ferguson—Equilibria in systems containing volatile components.
L. D. Finlayson, M.A.—The solubility of carbon dioxide in binary liquids.
Prof. H. O. L. Fischer—d- and l-glyceric aldehyde; d- and l-acetone glycerol, etc.
I. G. Goddard, B.A.—A study of sassafras lignin.
Prof. R. R. Gordon—The theory of solutions.
Dr. J. M. Grosheintz—Derivatives of d-glyceric acid; oxidation by lead tetra-acetate.
H. E. Gunning—Conductance of electrolytes by direct current method.
E. A. Hollingshead, M.A.—Differential diffusion constants of electrolytes.

W. J. Hornibrook, B.Sc.—The activity coefficient of potassium chloride in aqueous solution.
W. A. James, M.A.—Differential diffusion constants for hydrochloric acid.
A. A. Janis, M.A.—Sodium chloride solutions as isopiestic standards.
Prof. F. B. Kenrick—Mechanism of sour tasting.
Adsorption of water vapour on solids.
D. J. LeRoy, M.A.—Transference numbers of electrolytes in aqueous solution.
Prof. F. R. Lorriman—Reduction products of 9-nitro-anthracene.
W. A. E. McBryde—Sour taste of acids.
J. W. McCutcheon, M.A.—The geoisomerism of unsaturated acids.
Prof. W. H. Martin—Raman spectra of petroleum hydrocarbons.
J. C. Morgan, M.A.—Diffusion in copper sulphate solutions.
L. T. Munn, B.A.—Vapour pressure and vapour densities.
J. L. Myers, B.Sc.—The racemization of d-lactic acid.
W. M. Orchard, B.Sc.—The mercuration of furfuryl alcohol.
W. A. Patterson, M.A.—The temperature coefficient of diffusion.
Dr. J. J. Rae (with Miss Eastcott)—Phosphoric acid and metabolism.
H. H. Richmond—Synthesis of coniferyl alcohol.
W. J. Rogers, B.Sc.—Fire assay of ores for ruthenium.
J. Seath, M.A.—Spectrographic analysis for the platinum group and for gold.
S. Shankman, M.A.—The vapour tensions of sulphuric acid solutions.
H. Sheffer—An isopiestic study of sulphuric acid.
E. Y. Spencer, M.Sc.—The chemistry of the lactones.
M. H. Thomas, M.A.—Kinetics of the cis-trans isomerization of butene-2.
W. A. Tidridge, B.A.—The Raman effect in amino acids and their derivatives.
Miss M. F. H. Tung, B.Sc.—The Williamson ether synthesis with ethylene chlorhydrin and phenols.
W. M. Ward—Friedel and Crafts reaction, 5-hydroxy acenaphthene.
F. G. C. Wayman—Raman spectra of petroleum hydrocarbons.
M. Wayman, M.A.—Isolation and structure of bios IIB.
Dr. F. Wetmore—Rates of reaction; thixotropy.
G. E. Willey, M.A.—Distribution of potential in the carbon arc.
J. E. Wobus—Friedel and Crafts reaction.
Miss C. M. Woolsey, M.A.—Studies on organo-metallic compounds.
Prof. G. F. Wright—Stereochemical problems; organometallic chemistry; bios; lignin.

Food Chemistry, under direction of Professor C. C. Benson

During this session there has been in progress a small amount of research work, but none of it brought to completion.

There has been in progress a study of the nature of the proteins in lentils, and methods of estimating these proteins and separating them. There has been also further work on baking powders, and some study of various methods of estimating the surface area of the body. This last work has been carried out with a number of young women as subjects, and particularly in connection with work suggested some years ago by Dr. F. G. Benedict.

We have had no candidate ready this year for an advanced degree.

Geology and Palaeontology, under direction of Professor E. S. Moore

Field investigations in geology:

Professor E. S. Moore:—Geology of mines and other features of the Union of South Africa and Southern and Northern Rhodesia.

Professor A. MacLean:—Study of the geology of an additional section of the eastern portion of the Kirkland Lake area, for the Ontario Department of Mines.
Professor L. S. Russell:—Study and collection of fossil fish in Gaspé, Quebec.
Dr. J. Satterly:—Geology of the Windigo Lake Area, Kenora District, Ontario, for the Ontario Department of Mines.
Dr. V. J. Okulitch:—Geological studies and collecting in British Columbia and northwestern States.
V. K. Prest, B.Sc., M.Sc., (Man.):—Geology of the Miminiska-Keezhik Lake Area, for the Ontario Department of Mines.
M. W. Bartley, B.Sc., (Man.), M.A.:—Geology of the iron deposits under Steeprock Lake, Ontario, for the Ontario Department of Mines.

Laboratory investigations:

Professor G. B. Langford with W. L. McDonald:—Structural contouring as an aid in locating ore deposits.
Professor G. B. Langford:—Preliminary investigation of rock bursts in mines of Ontario, for Ontario Department of Mines.
Professor L. S. Russell:—Osteology of an armoured dinosaur from the Cretaceous of Alberta.
Description of a skull of a Titanothere from Saskatchewan.
Professor Madeline Fritz:—Description of the Devonian Bryozoa of Gaspé.
Comparative study of the Silurian corals *Multisolenia tortuosa* and *Desmidopora alveolaris*.
Dr. V. J. Okulitch:—Fossils of the Black River formations of the Coboconk section.
A new species of *Lichenaria* and evolutionary trends in Ordovician corals.

Under the direction of the staff in Geology:

C. E. Michener, B.A., M.A. (Cornell):—Ores of the Sudbury Nickel field.
V. K. Prest, M.Sc. (Man.):—Continuation of the study of wall-rock alteration in the Porcupine area.
M. W. Bartley, B.A. (Man.), M.A.:—Origin of the hematite deposits under Steeprock lake.
G. P. Crombie, B.Sc. (Man.), and D. Stadelman, B.A.:—Carbonatization in the Larder Lake Area, Ontario.
M. C. Gardiner, B.A.:—The gold deposits of the Atikokan Area, Ontario.
R. M. Sternberg, B.A. (Queen's):—Aquatic vertebrates from the Canadian Cretaceous.
H. S. Armstrong, B.A.:—The genus *Stigmatella*.
Miss M. C. Turner, B.A. (Alta.):—Ostracodas from the oil wells of southwestern Ontario.
J. O. Gorman, B.A.Sc.:—The ore deposits at Toburn mine, Ontario.

Household Science, under direction of Professor J. B. Brodie

During the session of 1938-39 there were three graduate students in this department but only two were engaged in research. One was granted her M.A. degree.

Miss F. E. Lamon, working under the direction of Miss Roberts, completed her work on Canadian cottons with respect to their suitability for household use as determined by physical and chemical analyses. Miss Lamon has had excellent coöperation with the Ontario Research Foundation in her work and has obtained both interesting and useful results from her study of Canadian sheetings. Since she has the appointment of research assistant for next year she plans to undertake the study of another type of cotton textile after which the results will be published.

Miss Jean Young has begun experimental work on her research, "Variation in the sense of taste and flavour" and has made good progress in her problem. She expects to continue with this study during the coming year.

Hygiene and Preventive Medicine, under direction of Professor J. G. FitzGerald

Mr. R. J. Wilson has again held the appointment of fellow in this department. He has continued his studies in staphylococcus. In co-operation with Dr. James Roberts, Hamilton, laboratory studies were carried out in connection with epidemics of staphylococcus food poisoning. These studies showed the relation of carriers to the epidemics. Dr. M. F. McGavin has assisted Dr. Donald Fraser in research in the field of diphtheria immunity. Dr. F. O. Wishart is pursuing research on dysentery.

Dr. Ella Kuitunen, who is working under a grant from the Banting Foundation, has conducted a comprehensive survey of intestinal parasites of children with the kind co-operation of Dr. Alan Brown. The incidence of enterobiasis was surprisingly high, namely approximately 50 per cent. A survey of the incidence of trichinosis in adults and children is in progress with the co-operation of Dr. I. H. Erb and Dr. G. L. Duff. The infection has been found in a new born child and in two adults. Approximately one hundred diaphragms have been examined by the direct and by the Baermann digestion methods.

Research studies have been actively carried on by members of the department who are also members of the staff of the Connaught Laboratories. A comprehensive report of these will be found in the report of the Director of the Connaught Laboratories.

Medicine, under direction of Professor Duncan Graham

Satisfactory progress has been made in the investigation of a number of clinical problems. Dr. Cleghorn, in association with Dr. J. L. A. Fowler, Alexander McPhedran Research Fellow, and Mr. J. S. Wenzel, has continued his investigations on adrenal glands. The first report of their work on the adrenal cortex in relationship to the functions of the sympathetic nervous system is now in press. Through the courtesy of the Ciba Company of Basle, it has been possible to test the synthetic adrenal cortical hormone, desoxycorticosterone, in the treatment of patients with Addison's disease, to study its effects on adrenalectomized animals and to compare the results with those obtained by the use of cortical extract. To date nine patients have been treated effectively with the synthetic hormone. All have shown a marked improvement in their sense of well-being and in increase of blood pressure and serum sodium. Appetites improved and added salt in the diet was well tolerated. As four of these patients had been under treatment with cortical extract for periods of one to four years, an attempt was made to determine the equivalent maintenance dosage of synthetic hormone. It would appear that 1.0 cc. or 5 mgm. of the synthetic hormone is of equal, or greater, potency than 5 cc. of the cortical extract used in the earlier treatment of these patients. Whether this synthetic hormone replaces completely the deficiency in function of the adrenal cortex caused by disease can only be determined by more prolonged observation. The claim has been made by Verzer that iodoacetic acid acts on the same chemical mechanism in the body as that controlled by the adrenal cortical hormone. In the course of an investigation to test this hypothesis, it has been found that iodoacetic acid produces a profound anaemia in dogs. This work is being continued.

A major problem for those using high voltage X-ray therapy in the treatment of cancer has been the treatment of radiation sickness which may develop in patients receiving this form of therapy. A year ago Spies reported favourable effects from nicotinic acid in the treatment of radiation sickness. With the consent of Dr. Richards, Dr. J. W. Graham undertook an investigation of the cause of radiation sickness and studied the effect of nicotinic acid in its treatment.

Dr. Graham has found that approximately 27 per cent of patients receiving high voltage X-ray treatment develop troublesome nausea and vomiting and that in 70 cases of nausea and vomiting the administration of nicotinic acid resulted in relief of these symptoms in 75 per cent. He found too that the drug was easily taken and had no after effect. A full report of this work will be published soon.

In association with Dr. Harold Box of the Faculty of Dentistry, Dr. Graham has undertaken a study of disturbances in oral secretion and their possible relation to dental disease. Definite progress is being made.

The effect of certain gold salts in the treatment of rheumatoid arthritis is being studied by Dr. Fletcher and Dr. J. W. Graham.

Dr. Farquharson and Dr. Hyland have published a report on eight cases of anorexia nervosa in which they discuss the nature of the disorder, its clinical manifestations and the treatment of the condition. In this important and timely contribution they have presented evidence to show that this syndrome, first described by Gull, is a metabolic disturbance of psychological origin and not a primary deficiency or dysfunction of an endocrine gland. Effective treatment is dependent upon the recognition of the nature of the disorder.

Dr. Hyland, working in coöperation with the Department of Medical Research, has continued his study on the electroencephalographic changes occurring in patients suffering from migrain and epilepsy. By this method of investigation it has been found that, in patients suffering from epilepsy, definite disturbances occur in the brain prior to the onset of an epileptic seizure. A preliminary report of this work is now in press.

In the past year, Dr. Gordon Bates and his Committee on Artificial Respiration of the Health League of Canada have published a valuable report on the benefits of prolonged artificial respiration in the treatment of cases of drowning, asphyxiation and electric shock. The interest aroused by the publication of this and other reports on the same problem should result in the saving of many lives from drowning.

One of the most important advances in medicine in the past year was the discovery of a new chemical compound called "M. & B. 693", "Dagenan" or "Sulphapyridine", which was found by Whitby to be effective in the treatment of experimental pneumococcal infections in mice and by Evans and Gaisford in the treatment of pneumococcal pneumonia in man. Through the courtesy of Messrs. May and Baker, we received a supply of this new drug for clinical trial and were the first in Canada to use this drug in the treatment of pneumonia. Evans and Gaisford reported a mortality rate in pneumococcal pneumonia of 8 per cent in their M. & B. 693 treated group of cases as compared with 27 per cent in cases receiving non-specific treatment. We have been able to confirm their findings and show that the drug is effective for all types of pneumococcal pneumonia. The results in the treatment of fifty cases of pneumococcal pneumonia have been published.

Mineralogy and Petrography, under direction of Professor A. L. Parsons

Professor A. L. Parsons has completed during the year the study of Magnesiochromite from the Caribou pit, Coleraine Township, Quebec.

Professor Ellis Thomson and Mr. J. S. Allen have completed a study on Nickeliferous Pyrite from the Denison Mine, Sudbury District, Ontario.

During the summer of 1938 Professor M. A. Peacock devoted some weeks to editorial work at Harvard University on the new *System of Mineralogy* of Dana. During the past academic year in our own laboratories Professor Peacock has been engaged in mineralogical studies leading to definitive descriptions of: Dyscrasite from Andreasberg, Harz, in relation to the new mineral Goldschmidtine from the same locality; Maucherite from Sudbury and Thüringia, and Temiskamite from Gowganda, Ontario (with Dr. G. A. Harcourt, International Nickel

Company); Rammelsbergite from Ontario (with Mr. C. E. Michener, International Nickel Company, assisted by Professor F. E. Beamish, department of chemistry); Calcium diborate hexahydrate from a mortar of Portland cement and Colemanite (with Professor V. A. Vigfusson, University of Saskatchewan).

Dr. V. Ben Meen has completed a study of the San Luzia de Goyez meteorite from Brazil and the study of some newly discovered Vesuvianite from Great Slave Lake, N.W.T.

Mr. L. G. Berry is occupied in structural studies of mineral sulpho-salts, an early division of the *System of Mineralogy* in which there are many uncertainties. He has completed a study on Cosalite from Canada and Sweden and has accumulated many new observations on materials named Jamesonite, Galenobismutite, Boulangerite, Heteromorphite, Dufrenoysite, Lillianite and Seleniferous Chiviatite.

Mr. J. S. Allen was engaged in a study of carbonatisation of rocks at Red Lake, Ontario.

X-ray laboratory. The apparatus for the study of crystal structures was completed at the end of November, 1938; since then it has given continuous satisfactory service, the records showing 137 X-ray photographs representing nearly 2000 running hours. An account of the design and uses of the apparatus in mineralogy is in preparation.

Apart from photographs taken for purposes of calibration or identification the work in the X-ray laboratory has been directed mainly toward obtaining new or improved structural data on minerals treated in the first volume of the new *System of Mineralogy* of Dana, now in preparation. Some of these minerals are typical Canadian ore minerals, and thus the resources of the Royal Ontario Museum of Mineralogy together with the facilities for exact X-ray work have led to valuable results.

The Walker Mineralogical Club, which was mentioned in the report for last year, has grown so that the membership now consists of three honorary members, two hundred and twenty-six ordinary members, and sixteen student members. The Club pays a portion of the cost of publication of "Contributions to Canadian Mineralogy" which has increased in size by the collaboration of our colleagues in other institutions who are members of the Club.

The contents of "Contributions to Canadian Mineralogy" for 1939 which is now in press and will probably be issued in October follows:

Berry, L. G. (University of Toronto). Studies of Mineral Sulpho-salts: I—Cosalite from Canada and Sweden.

Ellsworth, H. V. (Geological Survey of Canada). Transparent Green Pyroaurite from Ontario.

Faessler, C. (Laval University). The Stock of "Suzorite" in Suzor Township, P.Q.

Hawley, J. E. (Queen's University). The Association of Gold, Tungsten and Tin at Outpost Islands, Great Slave Lake.

Meen, V. B. (University of Toronto). Vesuvianite from Great Slave Lake Region, Canada.

Parsons, A. L. (University of Toronto). The Royal Ontario Museum of Mineralogy.
Magnesiochromite from Caribou Pit, Coleraine Township, Quebec.

Peacock, M. A. (University of Toronto) and Vigfusson, V. A. (University of Saskatchewan). Calcium Diborate Hexahydrate from a Mortar of Portland Cement and Colemanite.

Peacock, M. A. and Michener, C. E. (International Nickel Company). On Rammelsbergite from Ontario.

Peacock, M. A. X-rays in Mineralogy: Design of a Serviceable Apparatus.

Rutherford, R. L. (University of Alberta). Anthraxolite from South Nahanni River, Northwest Territories.

Stevenson, J. S. (B.C. Department of Mines). Copper-Tourmaline-Hematite Veins at Highland Valley, B.C.

Thomson, Jas. E. (Ontario Department of Mines). Vesicular Carbonaceous Sediments in Lake of the Woods Region.

Thomson, Ellis (University of Toronto) and Allen, J. S. (University of Toronto). Nickeliferous Pyrite from the Denison Mine, Sudbury District, Ontario.

Warren, H. V. (University of British Columbia). An Occurrence of Cosalite in British Columbia.

Paediatrics, under direction of Professor Alan Brown

The staff of the Department of Paediatrics, University of Toronto, has been actively engaged in studies on the prevention and cure of the diseased conditions encountered during infancy and childhood. The cure of disease is naturally much more spectacular than the prevention, yet today everyone recognises that of the two, prevention is the more important. Accordingly, a great deal of the activity of the department is directed towards the prevention of disease.

With the exception of diseases such as syphilis and malaria, no chemical means had been found for combatting disease until about two years ago. At that time it was discovered that the chemical substance sulphanilamide had a striking effect in the treatment of patients infected with streptococcus, meningococcus and gonococcus. The value of this chemical has been strikingly shown in this department in the treatment of streptococcic meningitis, which formerly was fatal in 100% of the cases, while at the present time 50 to 60 per cent of the patients are recovering. Excellent results have also been obtained in the treatment of erysipelas and streptococcic infections of the throat. We have also attempted to evaluate the effect of sulfapyridine in the treatment of pneumococcal infections. No deaths have occurred in cases of uncomplicated lobar pneumonia in children over 2 years of age treated with sulfapyridine. However, our mortality in this age group treated without either sulfapyridine or serum has been only 2 or 3 per cent, so it is hard to draw conclusions. Of value in demonstrating the antipneumococcal effect of sulfapyridine has been the recovery through the use of sulfapyridine of 2 out of 5 cases of pneumococcic meningitis, a disease in which over the previous 10 years the mortality had been 100 per cent.

In cooperation with the Banting department of medical research, the use of electro-encephalography has been investigated in children presenting behaviour problems or suffering from convulsive disorders. Encephalograms have proven of definite value in distinguishing between convulsions and functional attacks. The value of Dilantin in the treatment of epilepsy has been studied with the finding that this drug while of value in controlling grand mal attacks is of little value in petit mal. The sequelae of birth injuries have been investigated, with the finding that a great number of these infants have permanent injuries in the nature of paralysis, convulsions or mental retardation.

Valuable information has been obtained on the requirements of vitamin C during pregnancy and early childhood. During the course of these studies it was necessary to develop an accurate method for the determination of vitamin C. Fortunately this has been accomplished and results obtained which indicate that during the period of pregnancy the mother requires large amounts of vitamin C. In regard to the nursing infant, it was found that it was essential for the mother to secure a proper amount, otherwise the amount present in the milk, and consequently in the infant's body, was below the optimal level. Vitamin C should be administered to the infant within the first month of life. Formerly it was not considered necessary until the infant was four or five months of age. In the past, attempts have been made by various observers to use single estimations of the vitamin C content of the blood as a means of diagnosing acute and

latent scurvy. We have found that single estimations of vitamin C in the blood are not a measure of the state of the vitamin C metabolism of the body as a whole. No measurable amounts of vitamin C have been found in the blood in such widely varying conditions as advancing scurvy, healing scurvy and infants showing no clinical evidence at all of scurvy. We are now working on vitamin C tolerance tests in infancy and childhood, which we hope will be valuable.

In cooperation with the department of obstetrics, University of Toronto, the dietetic department of the Toronto General Hospital, and the Visiting Homemakers' Association, studies are being made on the effect of diet on the pregnant woman, the infant, and the woman's milk. This work includes the keeping of individual records of food consumption, the estimation of haemoglobin, vitamin C, and phosphatase in the mother's blood, before and after delivery, chemical and vitamin measurements on the infant's blood, and vitamin measurements on the mother's milk. The dietary survey has shown that a considerable number of prenatal patients are lacking in some of the essential food substances. The chemical studies on the blood of the mother and of the child, and the mother's milk reflect these deficiencies. The deficiencies can be remedied in some cases by education concerning the diet and in other cases by supplementing the food supply.

In conjunction with the engineering department of the Canadian General Electric Company and the General Electric Company of Schenectady, studies are being conducted on air-contamination and air-sterilization. One of the important problems to be solved in connection with the care of patients in hospitals is the prevention of air-borne infection; that is, infection carried by the air from one patient to another. It has been found that the use of ultraviolet light will kill from 92 to 98 per cent of bacteria artificially introduced into an experimental cubicle. Barriers of ultraviolet light are very effective in preventing the spread of artificially introduced bacteria from cubicle to cubicle in an experimental room, even though 50 per cent of the air in the room is being recirculated.

The biological estimation of vitamins entails the expenditure of a great deal of time and much expense in comparison with chemical methods. Our laboratories are devoting a good deal of time to the perfecting of these chemical methods and their adaptation to vitamin measurements in the well and ailing child, and in Canadian foods.

Studies are being continued on heart disease, diabetes, nephritis, and other nutritional and infectious diseases in infancy and childhood.

During the past year the workers in this department have taken an active part in disseminating the wealth of information which has been obtained in recent years on the importance of proper nutrition to health. The benefits of proven scientific knowledge on this subject cannot be obtained unless active steps are taken to have it used in a practical manner by the nation.

Pathological Chemistry, under direction of Professor Hunter

The work on kidney function in experimental nephrosis has been continued by Drs. Nicholson, Urquhart and Selby. Drs. Urquhart and Selby carried out an extensive study of the excretion of various electrolytes by the nephrotic kidney. Dr. Nicholson with the assistance of Drs. Urquhart and Selby has devised a method of cross circulation whereby various degrees and types of unilateral kidney damage may be produced more readily than by the method originally used. Additional evidence was obtained supporting the view that the nitrogen retention in degenerative lesions of proximal convoluted tubules is due to back diffusion.

Dr. Nicholson has modified the specific method for the estimation of glucose by the use of Proteus vulgaris so that it may be carried out without the use of the angle centrifuge.

In continuation of work already reported on the specificity of arginase Dr. Woodward has obtained evidence which seems to settle in the affirmative the debated question, whether the enzyme attacks argininic acid. The kinetics of the reaction has been studied, and an attempt is being made to isolate and identify its products.

Mr. Gornall has succeeded in preparing considerable quantities of the previously unknown optically active form of citrulline. He is now engaged in studying the behaviour of this material in the urea cycle of the liver.

Mr. Gornall has also made additional observations upon the behaviour of carbamido-acids towards nitrous acid.

A method is being sought for the preparation of the unsaturated uroeanic acid (hitherto accessible only with difficulty) from histidine. As a first step it has been shown that the analogous conversion of phenylalanine into cinnanic acid may be accomplished by chemical means with a yield of 50 per cent. Whether the procedure successful in this instance will be similarly efficacious with histidine, remains to be ascertained.

An attempt is being made to develop a system wherein all the usual procedures of volumetric micro-analysis may be carried out with the use of no more than two standard solutions. The attempt gives promise of being successful, but the plan has not yet been submitted to a sufficiently comprehensive test.

Minor projects under way include a study (with a view to their improvement or simplification) of certain tests employed in the qualitative examination of urine, in particular of the tests for urobilin, fructose and lactose.

Pathology and Bacteriology, under direction of Professor W. Boyd

Dr. G. Lyman Duff and Dr. Desmond Magner have continued their experiments on the effect of tyramine injections upon various animal species. They have succeeded in producing in rabbits a type of arteriolar necrosis in brain, heart and kidneys, very similar to that encountered in cases of malignant hypertension in man. These lesions, however, are not produced with regularity, and further experiments have been undertaken in an attempt to discover what factors determine the development of these vascular changes. Dr. H. Hayward studied serial sections of the region of the vomerosphenoidal articulation from a number of routine autopsy cases in an attempt to determine the frequency of occurrence of the so-called pharyngeal pituitary. This study was unfortunately interrupted by illness. Dr. F. P. Dewar has made a histological study of the lungs from autopsy cases in which trauma contributed to death, with a view to determining the frequency of fat embolism unattended by clinical signs of this disease. Fat embolism of minor proportions was found in a large percentage of such cases, while intravascular fat droplets were virtually absent from the lungs of control cases. Cases of exceptional interest encountered among the routine autopsies have been given special study by various members of the staff with a view to ultimate publication. Dr. A. J. Blanchard has studied and prepared a report of a fatal case of Weil's disease, the first encountered in this department since 1925. Dr. A. W. Bagnall in collaboration with Dr. Duff has made a complete pathological study of an extraordinary case of polyarteritis nodosa associated with cystic disease of the lungs, a report of which will be published shortly. Dr. Bagnall has also collaborated with Dr. J. C. Richardson of the department of medicine in the report of a case of angioma arteriale of the cerebellum.

In the division of bacteriology a programme has been developed under Dr. P. H. Greey's direction and in cooperation with the department of medical research for an extensive investigation of chemotherapeutic agents. A number of new drugs prepared in the department of medical research have been studied by in vitro and in vivo methods and these have been compared with sulphanilamide and dagenan. A systematic search for compounds to be used against

the staphylococcus and the tubercle bacillus is well started and will be continued for a number of years. Particular attention was given to the study of dagenan in experimental pneumococcus infection by Dr. Greey and Dr. D. B. MacLaren, and, in association with Dr. C. C. Lucas of the department of medical research who followed the blood concentration of the drug, the best method of administration in infected white mice was determined. A comparative study was also carried out between this drug and a number of others in the treatment of infected mice. The exhibit on sulphanilamide treatment of urinary tract infections prepared by Dr. P. H. Greey, Dr. C. C. Lucas, and Dr. D. R. Mitchell of the department of surgery, was sent to the meeting of the American Urological Society in Quebec and won second prize. Dr. R. Margarite Price in her work on tuberculosis has been studying culture media in an endeavour to find one which will give growth of bovine strains from human cases of tuberculosis without the use of animals. She is planning to visit the European laboratories this summer to study their methods at first hand, particularly in Denmark and Great Britain. In emphasising the need for universal pasteurisation of milk she investigated an outbreak in 1938 of bovine infection in five children where the milk supply was not pasteurised, and in which the infection had come from a herd later destroyed. Her critical review of the literature on the problem of the bovine tubercle bacillus in human tuberculosis has been published this year.

The division of surgical pathology, in addition to its heavy diagnostic routine for the Toronto General Hospital, has been carrying on studies of bronchiectasis, gastric ulcer, and gastric carcinoma. A paper summarising the findings in the pathology of fifty cases of bronchiectasis was presented by Dr. W. L. Robinson at the annual meeting of the American Association of Pathologists and Bacteriologists at Richmond. It is hoped to have the work on gastric ulcer sufficiently advanced to present at the next meeting of this association in Pittsburgh. Dr. L. M. Gray has been studying testicular tumours and is preparing a paper reporting an especially interesting case with a summary of the subject as a whole.

In the division of neuropathology Dr. J. Clifford Richardson has completed his report on the pathological findings in the recent epidemic of acute anterior poliomyelitis and this material will shortly be ready for publication. He has also continued his investigation of intracranial aneurysm and has been engaged, in collaboration with Dr. H. H. Hyland, in an important review of cases of subarachnoid haemorrhage. Their combined detailed report will be published in the near future. Dr. Richardson is also collaborating with Dr. A. W. Bagnall in the report of a case of haemangioma of the cerebellum. Dr. K. G. McKenzie has, during the winter, reviewed his series of cases of meningioma and of spinal cord tumours, and has delivered papers describing his findings in both series. Dr. E. H. Botterell is continuing his investigations of injuries to the nervous system. He has collected a considerable amount of important pathological material, more particularly with reference to injuries of the cervical spine. Dr. M. G. Whillans is reviewing for publication, the cases of subdural empyema which are in the files of the division. Dr. Whillans has also collaborated with Dr. P. H. Greey in an investigation of cerebral lesions caused by pneumococcal infections of mice. Dr. M. R. Shaver has collected from the files of the division and in collaboration with Dr. K. G. McKenzie and Dr. W. S. Keith, cases of cyst of the third ventricle. He is preparing a paper on this subject. Dr. Linell has completed his investigations, in collaboration with Dr. E. Hall, of histological changes following insulin and metrazol injections in rabbits. The former has investigated haemorrhages into the brain-stem produced by head injury, and gave a paper on this subject before the American Association of Pathologists and Bacteriologists in March, 1939.

The head of the department gave the Mütter Lecture at the College of Physicians of Philadelphia, the Mercy Day address at Pittsburgh, as well as addresses in Boston, New York, Oklahoma City, Victoria, Montreal, Kingston, Richmond and Omaha.

Pharmacology, under direction of Professor V. E. Henderson

The research in the department has proceeded satisfactorily. Prof. Lucas has been studying methods for the identification of alkaloids secreted by the saliva and has an exhaustive paper on this topic nearly finished. Prof. Ferguson has continued his studies of the mechanism of the secretion of the active principles of the pituitary in labour. This is being reported at the meeting of the American Physiological Society and will be submitted for publication. He has also in press a study of the anaesthetic properties of allene, a possible contaminant of cyclopropane. He is also studying the extravagal respiratory reflexes. Dr. Bonnycastle has in press a paper dealing with the effects of procaine, used so much in spinal anaesthesia. He has shown conclusively that its danger lies in the paralysis of the nerves to the diaphragm, rather than on the centre. He is also studying the effects of drugs on hypertension.

Dr. Rice and myself published a paper dealing with the effects of certain drugs on respiration and particularly on respiratory reflexes. Dr. Rice published a paper on the vagal reflexes affecting respiration.

A study has also been made of the anaesthetic actions of cyclopropane by myself, and with Prof. Lucas a study has been made of proposed pharmacopoeial definitions of cyclopropane.

Physics, under direction of Professor E. F. Burton

Low Temperature Laboratory:

The work in this laboratory has been done in cooperation by the following members of the staff and research students: Professors H. Grayson Smith, John Satterly, Arnold Pitt, and J. O. Wilhelm, Dr. H. E. Johns, holder of a National Research Council Studentship, J. C. Findlay, assistant demonstrator, H. M. Bryant, assistant demonstrator and R. G. Elson, graduate student.

Investigations have been carried out on the following problems: (1) the flow of liquid helium through capillary tubes and some anomalous viscosity effects in liquid helium II; (2) the viscosity of liquid hydrogen; (3) the velocity of sound in liquid helium with particular reference to a change at the transition point from helium I to helium II; (4) the specific heats of metals of the iron group; (5) the development of a balance for use in the measurement of the magnetic susceptibilities of various substances at liquid helium temperature.

Spectroscopy

Atomic Spectra

The following problems in the field of atomic spectra were investigated during the past year: the multiplet structures of the third spectrum of lead and of thallium; the hyperfine structures of lines of the various spectra of thallium, bismuth, aluminium and phosphorus. The atomic beam source developed a year ago has been greatly improved and is being used in the hyperfine structure investigations, particularly for the small isotope shifts of the heavier elements and the narrow magnetic structures of the lighter elements. Professors M. F. Crawford, A. B. McLay, Dr. R. Richmond, Mr. W. M. Gray and Mr. J. Convey participated in these researches.

A theoretical interpretation of the anomalous multiplet and hyperfine structures of the G levels of Tl II and Pb III was completed by M. F. Crawford.

Molecular Spectra

Important advances were made during the year in the technique of Raman spectroscopy. A method was developed for obtaining the Raman spectra of small quantities of liquid with short exposure times. For example the complete Raman spectrum of 1 cc. of carbon tetrachloride can be obtained in one minute,

and even with extremely small quantities of liquid, of the order of two or three drops, an exposure of only thirty minutes is required. This is equivalent to about a thirty-fold increase in speed over the previous techniques. The importance of this new technique is: firstly, chemical and biological materials that can be produced in a pure state only in very small quantities can be studied; secondly, Raman spectra can be used to detect small amounts of molecular impurities present in a sample, particularly in organic substances; and thirdly, weak Raman effects characteristic of interactions between molecules can be investigated and used to study such problems as change of state.

A new method of obtaining the polarisation of Raman lines was also developed. This information, which is of greatest importance in assigning frequencies of modes of vibration of the molecule, can now be obtained in about one-twentieth of the time required with former techniques.

These techniques were devised by Dr. H. L. Welsh and Professor M. F. Crawford, and were proven experimentally with the assistance of Mr. P. J. Sandiford. A number of problems in molecular structure are now being investigated by this group and Dr. Elizabeth Allin.

Spectrographic Chemical Analysis

The facilities for analysis by both emission and absorption spectra have been improved, and during the year two graduate students, Mr. R. W. Rae, and Mr. R. W. Callon, were given a course of instruction in methods of analysis, under the supervision of Professors Ireton, Crawford and Dr. Welsh. A number of requested analyses of widely different materials, ore, wood pulp, insulin, liver extract, photographic materials, were made by Dr. Welsh and the two graduate students.

Geophysics

Magnetic and electrical resistivity exploration in a limestone region has been carried out by Professor Lachlan Gilchrist, A. R. Clark and K. C. Mann, assistant demonstrators, M. J. S. Innes and D. W. R. McKinley, graduate students: (*a*) Vertical component magnetic measurements were carried out in a region containing extensive masses of sedimentary limestones—the porous sections of which contained gas, oil, and saline water. Making use of the values of the permeabilities of these substances the expected magnitudes of the vertical components were determined. These were measured and corrected for latitude and time of day. The results indicated the possibility of distinguishing a region of dry crystalline dolomite from that of porous dolomite containing oil and saline water.

(*b*) Making use of deep drill holes in resistivity measurements it was possible to delineate regions of high resistivity, e.g., dry limestone or porous limestone containing gas and oil from regions of porous limestone containing saline water.

Dr. Arthur A. Brant spent the summer of 1938 as geophysicist in one of the Geological Survey parties under the Ontario Department of Mines, in the region of Steep Rock Lake, north of Atikokan, Ontario. As a sequence of this work arrangements were made for a party to carry out investigations on the ice over this lake, for the purpose of trying to determine the disposition of a supposed iron ore vein underneath the lake itself. Dr. Brant was assisted in this work by the following: A. R. Clark, assistant demonstrator, J. W. Britton, Fred McDonald, and E. W. Banting, students, and T. L. Boyle (Queen's University). This winter investigation was carried out in the months of January, February and March, and has received recognition among mining people as a very important contribution to ore discovery.

It is gratifying to know that for the present summer, the Department of Mines has sent out a definitely geophysical party, under Dr. Brant. Two graduate students A. R. Clark, and J. W. Britton are members of this party.

The promising future of work in geophysics is stressed by the fact that the department of physics has already had donations, and promises of financial help which will enable the department to maintain two fellows, full time, for next year, and possibly two other research workers chosen from students who have just graduated.

The Electron Microscope

Mr. James Hillier, assistant demonstrator, and Mr. Albert Prebus, holder of a studentship from the National Research Council, have continued the work of perfecting the electron microscope, and have succeeded in taking many photographs of sub-microscopic structures up to a primary magnification of 30,000. This is equivalent to being able to separate two points on an object at a distance of .0000004 inch, or .00000100 cm, or 100 Å.U., apart. In addition to the studentship held by Mr. Prebus, the National Research Council gave a small grant during the present year to enable these two workers to continue the work during the summer vacation of 1938. The electron microscope is so promising that assistance has been offered by the National Research Council and the Banting Institute to keep these two workers employed full time for the next calendar year, beginning July 1, and we are hoping for some outstanding results.

Other Investigations

Molecular Films: Professor McTaggart has continued the work on the optical properties of thin films of oriented molecules built up in molecular layers on glass. The interference colours shown by such films are found to be enhanced by building them on glass slides covered, by evaporation, with a very thick film of chromium.

Professor C. Barnes was asked, by the British American Oil Company, to work out the theoretical interpretation dealing with the operation of equipment developed for making measurements of density in continuous flow systems, especially those systems used in the cracking of petroleum hydrocarbons. At the annual meeting, 1938, of the American Petroleum Institute a paper was presented by R. L. Rude (British American Oil Co., Ltd.) R. D. Junkins (Bailey Meter Company) and C. Barnes, in which the work is given in some detail. A further paper was given (on the instrumental development of the methods for density measurement) at the Carnegie Institute of Technology, Pittsburgh, on March 2, 1939, by R. L. Rude and C. Barnes.

Short Electromagnetic Waves. Under the immediate direction of Professor Arnold Pitt an experimental study of very short radio waves is being carried on by Mr. A. W. Love. A suitable short wave generator system has been developed and work is being done on the transmission of such waves in tubes.

Dr. D. W. R. McKinley, completed a very excellent laboratory determination of the velocity of light using an oscillating quartz crystal as a light shutter. A paper on this work has been published in the Canadian Journal of Research, and a second paper is in course of publication on the use of a quartz crystal to determine the rotation of the plane of polarisation of light. Dr. McKinley accepted, during the year, a position with the National Research Council at Ottawa.

Dr. J. M. Anderson, demonstrator, with the assistance of Mr. C. A. Herald, graduate student has continued his work on the duration of emission lines using the positive ray beam method. A preliminary series of plates has been taken and the data is at present being worked out.

Dr. C. K. Cheng, graduate student, has completed an investigation on the determination of the dielectric constant of various salts with different amounts of water of crystallisation, and has obtained some very noteworthy results. He has been awarded the Ph.D. degree, and has returned to China for educational work.

Dr. W. F. Oliver, while serving as a lecturer at McMaster University, has been working consistently, during his spare time, on the structure of condensates at low temperatures as indicated by X-ray diffraction patterns.

The students listed below have been carrying on their work under the following awards: J. Convey, M.Sc., (Alberta) a Bursary from the National Research Council; W. M. Gray, M.A., H. E. Johns, B.A. (McM), M.A., and Albert Prebus, M.Sc., (Alberta), Studentships from the National Research Council.

Radon Seed Production

The apparatus for the production, and quantitative calibration, of radon seeds, which is the property of the Provincial Department of Health, but is under the direction of the Director of the McLennan Laboratory, has been operated very satisfactorily during the past year, by Dr. L. T. Newman, a former graduate student in the department of physics.

Physiology, under direction of Professor C. H. Best

The members of the staff of the Department of Physiology have gained the impression during this year, that too much work is being concentrated in the third year. The previous arrangement under which part of this subject was taught in the second year would appear to be preferable.

The head of the department has delivered a number of lectures in other universities since last year's report was prepared. The Stephen Paget lecture was given on June 6th in the London School of Hygiene, on "Insulin and Diabetes —the Present Position". A lecture on "Heparin and Thrombosis" was presented at University College, University of London, on June 9th. Lectures were also given at the British Postgraduate Hospital and at St. George's Hospital. A Mayo Foundation lecture on "Heparin and Thrombosis" was given on October 31st in Rochester, Minnesota. The inaugural Renziehausen lecture on "Historical and Recent Developments of the Insulin Situation" was presented on December 5th at Pittsburgh. An Eastman Foundation lecture on "Thrombosis" was given on December 16th in Rochester, New York, a lecture on "Thrombosis" was given at Yale on March 8th and a lecture on "Insulin and Diabetes" at Harvard on March 9th.

A particularly productive year in research has been enjoyed. Dr. R. E. Haist, assisted by Miss H. J. Bell and working in conjunction with Miss J. H. Ridout of the department of physiological hygiene, and Dr. Best, has shown that diet very definitely influences the insulin content of the pancreas. When diets rich in fat are given, a marked decrease in the insulin content can be determined within one week. These results open up many new fields for investigation. Dr. Haist has been awarded the Starr Gold Medal for 1939.

Dr. James Campbell and Dr. Haist, working under the general direction of the head of the department, have shown that there is a prompt fall in the insulin content of dogs' pancreas when diabetogenic preparations of the pituitary gland are administered. After seven daily injections the insulin content is reduced to extremely low levels but returns sharply to the normal value when the injections are discontinued. If, however, the injections are maintained for 15 to 20 days the insulin content usually remains at the low value when the injections are stopped. Dr. Campbell and Mr. H. C. Keenan have made considerable progress in the fractionation of the diabetogenic substances and have been studying as well those materials in the anterior pituitary extract which increase the deposition of fat in the liver, produce ketosis, and promote lactation. Mr. Keenan, who held a Reuben Wells Leonard Fellowship from University College during the year, has elaborated a very useful method of testing ketogenic preparations.

Professor N. B. Taylor has been unable to devote as much time to research as he would like, owing to his being occupied with the revision of the physiological

text of which a new edition is to appear in the autumn. In Dr. Taylor's section research upon intestinal obstruction is being continued by Dr. W. F. Greenwood, who is devoting a year to research in the department. Dr. Greenwood, with the assistance of Miss L. E. M. Roddy, has also investigated the blood potassium in animals dying of acute intestinal obstruction. Experiments upon renal hypertension have been carried out by Dr. Greenwood, with Dr. R. Nassim who is on leave of absence from St. George's Hospital, London, and some results of great interest have been secured. A rapidly developed hypertension (over 200 mm. Hg, with retinal and intestinal haemorrhages and enormous enlargement of the heart) has been produced in dogs by preventing the renal hypertrophy which ordinarily results from the removal of one kidney. Hypertrophy of the remaining kidney was prevented by enclosing it in a cast of collodion-soaked gauze. These results suggest that the essential factor in the development of renal hypertension is the inability of the kidney to increase its activity proportionately to the work demanded of it.

The section of biophysics, under the direction of Dr. D. Y. Solandt, has carried out physiological research along a variety of lines. Polarisation at the neuromuscular junction and its effect on excitation has been studied. A survey of possible methods of modifying the denervation degeneration in the skeletal muscle of the rat is being undertaken with a view to gaining a better understanding of this process. It is also hoped that the results will prove useful in evaluating the methods used in the treatment of denervated muscles in humans. Mr. J. W. Scott has completed the work on the relation of the "reaction of degeneration" to the Sherrington phenomenon in skeletal muscle. He is proceeding with a study of the site of excitation in the so-called direct excitation of muscle. An oscillator and vibrator for testing vibration sense have been designed and constructed with the help of Mr. J. D. Brown. Using this equipment, Dr. E. H. Botterell and Dr. Solandt have collaborated in testing normal and abnormal vibration sense in man. Mr. W. D. Gray has studied the relation of non-electrolytes in the environment of nerve tissue to the excitability constants of that tissue. An adjustable renal artery clamp and applicator have been designed and constructed. In collaboration with Dr. Nassim, this clamp has been used to produce the Goldblatt type of hypertension in dogs. These animals were then, through the use of a special pump, studied during and following "pressure-isolating" cross circulation with normal animals. In collaboration with the head of the department, studies are at present being made on the relation of dietary choline to acetylcholine production in rats. An outline of the collaborative work of this section with the staff in the department of physiological hygiene in the study of the effect of heparin on cardiac mural thrombus formation and on certain aspects of blood clotting is given elsewhere.

Dr. Botterell, in collaboration with Dr. Solandt, has performed a number of experiments on cats in an effort to determine the significance of the central control of micturition. It has been difficult to establish the normal cystometrogram, and they have studied several curarised animals with this object in view. Dr. Botterell, in collaboration with Dr. K. G. McKenzie, Dr. David Pratt and Dr. W. S. Keith, is writing a neurosurgical guide for medical students. His section of this small book deals with the examination of the nervous system and the interpretation of findings. Actually it is a summary of the applied physiology of certain aspects of neurology.

The work begun last session and outlined in last year's report on the role of the liver in canine anaphylaxis has been continued by Dr. E. T. Waters and Mr. L. B. Jaques, who have found it possible to isolate crystals of heparin from the blood of dogs in anaphylactic shock. This conclusively proves that the marked increase in the clotting time of the blood in anaphylaxis is due, at least in part, to the liberation of heparin from the liver. An interesting observation made in connection with these studies is that heparin crystals contain an appreciable amount of water of crystallisation, a fact to be borne in mind when com-

paring the potency of various heparin preparations. Dr. Waters, Dr. J. Markowitz and Mr. Jaques have demonstrated sensitisation in a dog with an Eck fistula; a typical anaphylactic reaction was obtained, except that there was no engorgement of the liver.

Dr. Waters and Dr. Jean P. Fletcher have made a study of the product of enzymic hydrolysis of glycogen by a glycerol extract of muscle. The late Dr. A. D. Barbour of this University stated the sole product of this reaction to be a trisaccharide, but a number of independent investigators have failed to confirm this finding. The product which we have isolated, in excellent yield, has properties very similar to those reported by Barbour, and as the result of much careful testing we can now state that the material, while not homogeneous, is chiefly a trisaccharide composed of three glucose units. Such a compound has obvious chemical as well as physiological interest.

Dr. E. Fidlar has collaborated with a number of his colleagues in a great variety of researches during this last year, and results of very considerable importance have been obtained. Working with Dr. Waters, Dr. Markowitz and Mr. Jaques, he has shown that a very sharp drop in platelet count takes place after injection of anti-genic serum into sensitised dogs. This was first done in hepatectomised animals, and subsequently in animals with the liver present. In a series of experiments with Dr. Waters, Dr. Fidlar has found that the blood platelets are greatly reduced in number and show evidence of clumping in peptone shock. Dr. Fidlar and Dr. Waters have also studied the platelet counts in the blood of heart-lung preparations, and have thus far failed to confirm Howell's theory that platelets are produced in the lung. Dr. Fidlar has shown that there is a very rapid drop in platelet count in dogs in which the blood has been made to flow through glass cannulae, where large white thrombi form. Dr. Fidlar, working with Dr. E. W. McHenry and Miss M. Sheppard of the department of physiological hygiene, has made a very interesting study of the increase in metabolic rate observed in guinea-pigs placed on a diet deficient in vitamin C. Dr. Fidlar has collaborated with Dr. James Campbell in a study of the basal metabolic rate of dogs at various intervals after the injection of diabetogenic preparations of the anterior pituitary gland.

Psychiatry, under direction of Professor C. B. Farrar

The most important development of the year has been the organisation of a research unit at the Toronto Psychiatric Hospital, made possible by a grant from the Rockefeller Foundation jointly to the department of psychiatry and the department of medical research. For this purpose a ward clinic of twenty beds has been set aside on the third floor of the hospital with clinical staff provided by the Department of Health, and with laboratories for biochemistry and electroencephalography equipped and staffed by the department of medical research. Initial studies now under way will compare the effects of various types of pharmacologic shock. Selected early cases of schizophrenic reaction will first be investigated, with a view to determining possible common features of various forms of treatment which empirically have been found beneficial.

Psychology, under direction of Professor E. A. Bott

In 1938-9 forty-seven graduate students were enrolled in the department of psychology, seven of whom were from three other departments. Twenty-one of the graduates enrolled were from eleven other Canadian Universities, two from the United States and one from England. Two candidates were recommended for the Ph.D. degree and twelve for the M.A. degree. The names of these degree candidates and the subjects of their theses follow:

For the degree of Doctor of Philosophy:

Salter, Mary D.: The Concept of Security as a Basis for the Evaluation of Adjustment.

Turner, G. H.: A Study of the Effect of Fixed-Pace Work upon Health.

For the degree of Master of Arts:

Appleby, R.: Differences in maze-solving ability among inbred strains of laboratory house mice.

Bertram, V.: A Study of affective behaviour in eight preschool children.

Cates, T.: A study of the dominative and submissive behaviour of eight preschool children.

Gifford, E. V.: Schizophrenic performance of the 1937 revision of the Stanford-Binet (Form L).

Loomer, A.: A multiple factor study of the Moss Medical Aptitude Test.

MacDonald, D. S.: An interest questionnaire for secondary school boys.

Miles, H.: A Study of responsibility in a nursery school setting.

Scott, F.: Adult-Child relationships in a nursery school setting.

Sedgwick, M. S.: A study of unlawful non-attendance (truancy) in the City of Toronto.

Stewart, V. E.: A follow-up study of a group of 161 juvenile delinquents.

Sunley, J. H.: A study of job satisfaction in a retail department store among male sales clerks.

Wang, C. H.: An investigation of the contribution of Bertrand Russell's theory of neutral monism to Psychology.

During the past year our staff have been engaged upon a number of special investigations and plans have been laid to commence new studies in collaboration with other faculties and departments. Owing to our serious need of funds for laboratory research equipment, our problems have been chosen largely outside of the laboratory.

A committee of the staff has charge of the studies now being conducted under post-doctoral research fellowships which the department is establishing. The John Northway Memorial research fellowship, provided in 1938 for five years, has permitted an intensive study to be made of the educative values in summer camp procedures. This investigation will be continued and related to the educational experience of the children during winter. A David Dunlap Memorial research fellowship has also been established this year through the kindness of Mrs. Dunlap who has generously assisted the University with undergraduate scholarships for many years. This fellowship will aid in a three-year projected study upon the progress and adjustment of students entering the faculty of medicine. A third research fellowship is contemplated to be devoted to problems of delinquency and penology at the preventive level along the lines urged in the Royal Commission Report on the Penal System in Canada. Knowledge based upon investigation is essential for the guidance of practice in these fields.

Professor Chant is giving individual attention to problems of students' educational adjustment especially in the faculty of medicine, which has recently appointed a Students' Advisory Committee to follow this work. An evaluation of the Medical Aptitude Test is being undertaken and of other factors which influence the success and failure of students entering medicine.

Professor Line has directed a number of inquiries concerning school children in the grades of city public schools with a view to appraising psychologically the results being obtained under the new Ontario curriculum. Special attention is being given to achievement in reading in the early grades.

Professor Ketchum with the aid of graduate students and seniors in the sociology course is engaged upon a comprehensive programme of studies relating to social patterns of the City of Toronto. These are both historical and con-

temporary; they involve mapping the growth and changes of specialised areas in the City, indicating the density and mobility of population, size and location of foreign groups, incidence of crime, public attitudes as indicated in municipal voting, etc.

Professor Cosgrave, with the facilities provided in the vocational laboratory opened at 102 St. George St. last year, has given vocational examinations and guidance to 25 young people referred from schools, agencies and industry. The number of requests for examination greatly exceeds the number undertaken. The laboratory aims to establish principles rather than only to offer service in the vocational field. Dr. Cosgrave's work upon methods for the selection of pupil nurses is continuing with the School of Nursing.

Professor Myers, through his position as psychological consultant in the Ontario Department of Health, is exploring the application of psychological measurement methods in connection with the diagnosis and treatment of schizophrenic conditions. Many of our graduates are entering this important field of public service under the direction of Dr. Myers.

Professor Bernhardt has charge of studies in the animal laboratory of the department at 69 St. George St. These are related on the one hand to studies in genetics under the department of biology and on the other to studies with pre-school children under the Institute of Child Study. Arrangements have been completed to commence a special study on neurotic behaviour in rats through co-operation with the department of medical research.

Professor Bott has continued studies in muscular action, particularly ocular behaviour in reading. He has also taken steps with Dr. Cosgrave to examine the recent work on personnel selection in aviation from Britain and the United States with a view to co-operating with the Canadian Department of Defence in the solution of psychological problems in this field.

The staff in psychology at Toronto has taken an active part this year in the establishment of the Canadian Psychological Association. At an initial scientific and business meeting held here on April 12th, Dr. Bernhardt contributed a paper along with Dr. Humphrey of Queen's University. During the year Professor Ketchum along with Professor Morton of McGill conducted a survey of recent psychological research in Canadian universities, and prepared an extensive report which is now available in neostyled form. It is hoped that the formation of this association will appreciably strengthen and unify the teaching and research in psychology throughout the Dominion.

Therapeutics, under direction of Professor R. F. Farquharson

As formerly, research work in Therapeutics has been closely associated with similar activities in the department of medicine. In particular, a careful study of the results of prolonged treatment of patients suffering from pernicious anaemia has been carried on. Further investigation of anorexia nervosa and its relation to various endocrine diseases has been made and, in association with Dr. H. H. Hyland of the department of medicine, a report of part of this work has been published.

Medical Research, under direction of Sir Frederick Banting

Dr. Banting has continued his work on the experimental tumour problem, but unfortunately, this work was greatly interrupted by his survey of Canadian Universities and Hospitals made under the auspices of the Associate Committee on Medical Research of the National Research Council of Canada.

The work under the direction of Dr. W. R. Franks has been largely confined to the further study of synthetic antigens and serologically active derivatives, particularly those related to carcinogenesis. Dr. Franks has found that the administration of antigens formed by linking dibenzanthracene to casein reduces

tumour production, from various sources, significantly. He has also shown that the degree of protection against carcinogenesis varies inversely with the tumour incidence in the groups studied and that heredity also influences the response.

During the year the methods of conjugating carcinogens to protein have been improved.

Mr. L. F. King, working under an Eli Lilly Fellowship, and Dr. Franks have been studying the use of non-carcinogenic sulphonyl chloride derivatives of the carcinogens for conjugation. The immunological activity of substances so linked has been established and the sulphonic derivatives of some of the carcinogens have been prepared. Similar conjugation of oestrone and other oestrogenically active compounds is being studied.

An exploration of the immunising activity of various conjugates of carcinogens and their derivatives has been commenced. The synthesis of suitable derivatives of the carcinogenic hydrocarbon has been undertaken by Dr. H. J. Creech, working at Harvard University under a grant from the International Cancer Research Foundation and as a part-time fellow in this department. Two compounds, thus prepared, have been used in immunisation studies in our laboratory. Mr. W. N. Keefe has studied, with Dr. Franks, the preparation of derivatives of the carcinogenic azo compounds suitable for antigen formation.

Mr. G. A. Meek and Dr. Franks have been using step molecular films to follow immunological reactivity. This technique is particularly valuable in detecting the degree of cross reaction between prosthetic substances. Results have been applied to the immunisation studies in mice.

The immunisation studies connected with the various aspects of the tumour problem have been carried out by Miss M. M. Shaw and Dr. Franks.

Some factors which might possibly influence antibody production have been studied by Mr. F. B. Thomson and Mr. R. C. Smith, who investigated the influence of hypophysectomy and serum protein replacement following plasmaphoresis, on hemolysin production.

The influence of irradiation on the metabolism of tumours is still being studied by Dr. Franks and Mr. G. J. Millar. The irradiation of the animals has been carried out with the cooperation of the department of radiology.

The work on the conjugation of substances isolated from the tubercle bacilli in an endeavour to form new antigens is being continued by Dr. Franks and Miss E. Grant. Dr. P. H. Greey, of the department of pathology and bacteriology, has cooperated with these workers in the animal experiments.

The work on experimental heart disease which has been in progress for several years has been financed, in part, this year by a grant from the Josiah Macy Jr. Foundation, New York, who have also provided three fellowships for this work.

Dr. C. G. McEachern, Mr. G. W. Manning and Dr. G. E. Hall have shown that although the size of the infarct produced in myocardium following ligation of a major coronary artery is the same in the anaesthetised and conscious states the mortality is greatly reduced under anaesthesia. Similar ligation with the animal under the influence of atropine reduced the mortality from 75 per cent. to 50 per cent.; when the cardio-sensory pathways were removed on one side the mortality following ligation in the conscious state was reduced to 30 per cent., while total ablation of the cardio-sensory nerves reduced the mortality to less than 10 per cent., although the size of the infarct remained the same. Other drugs are being investigated in relation to their influence on cardiac pain and mortality following coronary occlusion.

Dr. J. M. Janes and Dr. Hall have been studying the relationship between the cardiovascular system and the biliary tract. It has been shown that in some instances distention of the gall bladder caused cardiac irregularities but no chronic cardiac changes could be definitely associated with chronic cholecystitis.

Dr. Janes has also studied the relationship of experimental hypertension to

cardiac function and has been investigating methods of increasing the blood flow to ischemic kidneys.

Dr. Janes, Dr. I. W. Mann and Dr. Hall have been studying experimental cholesterol atherosclerosis in various species of animals and found that ordinarily such lesions can only be produced in rabbits.

Dr. Mann has also attempted to produce arterial changes in rats by the prolonged feeding of lecithin, cephalin, sphingomyelin and total crude phospholipids of adrenal and brain origin.

Mr. Manning and Miss Lang have studied the effect on blood sugar of the parasympathetic drugs atropine, pilocarpine, eserine, etc. in normal, adrenalectomised and depancreatised dogs.

Dr. Mann and Dr. Hall have investigated the influence of vitamin D, thyroid extract and acetylocholine, singly and in combination, upon the cardiovascular system in rats. They have found that of these agents only acetylcholine produces endothelial changes in the arteries. Dr. Hall has also shown that calcareous changes can be produced in the coronary arteries, aorta and heart muscle of rabbits following the subcutaneous injection of acetylcholine.

Mr. D. W. Lougheed has made extensive physiological and biochemical studies following the intravenous injection of oxygen, carbon dioxide, nitrogen, helium and air into animals. The problem of asphyxia was also studied by Mr. Lougheed and later, in conjunction with Dr. Janes, Mr. Manning, Dr. Banting and Dr. Hall, physiological studies in experimental drowning were carried out. The results of these experiments may be applied directly to human cases.

The problem of the physiological significance of metrazol and insulin shock therapy in the treatment of schizophrenia has been continued by Mr. J. E. Goodwin, Mr. F. L. Lawson, Mr. W. K. Kerr and Dr. Hall. Through a grant from the Scottish Rite Masons, Northern Jurisdiction, an intensive study was made on the changes in the electrical activity of various regions of the brain in response to intravenous and locally applied metrazol.

Miss Lang, Mr. B. Leibel and Dr. Hall have studied the influence of various drugs, which affect the autonomic nervous system, on the effects produced by subsequent injections of metrazol. This series of experiments has been followed by the work of Mr. Lougheed, in which a detailed study of the blood gases, alveolar air, systemic and pulmonary blood pressures, heart rate, splanchnic volume, etc. was made before, during and after metrazol shock.

Through the generosity of the Rockefeller Foundation, clinical research, in conjunction with the department of psychiatry has been made possible. A thorough physiological, pharmacological and biochemical study has been started by Dr. Hall with Mr. Lougheed and Miss Melrose, on the patients receiving shock therapy as a form of treatment for schizophrenia. In conjunction with this project purely experimental work has been undertaken in this department in an endeavour to study, experimentally, the many problems which arise from the clinical investigation.

Mr. Goodwin and Dr. H. H. Hyland (of the department of medicine) have obtained some valuable information from their electroencephalographic studies of epileptic cases from the Toronto General Hospital. Following the completion of an electroencephalographic unit in that Hospital this work is progressing rapidly.

Mr. Goodwin and Drs. K. G. McKenzie and E. H. Botterell have been using the electroencephalogram for localisation of brain tumours and epileptic foci with excellent results and have started using localising electrodes at operation on the exposed cortex.

Mr. Goodwin and Dr. W. A. Hawke (of the department of paediatrics) have continued their studies of the brain potential changes in "behaviour problem" children and in the convulsive states. Records of normal children are also being obtained.

Dr. D. P. C. Lloyd has been following two main problems. These are: the excitability of ganglion cells and the transmission of impulses through sympathetic ganglia and the transmission of excitation to smooth muscle. The recognition of Dr. Lloyd's work in this field has led to his appointment as an assistant in the Rockefeller Institute.

Assistance was given by Miss Lang and Dr. Janes to the problem of cholecystitis and liver function brought to the department by Dr. Dean McDonald of St. Catharines.

Again this year the Department of Medical Research has enjoyed the cooperation and financial assistance of the McIntyre Porcupine Mines and the Ontario Mining Association in the problem of silicosis.

Mr. J. J. Denny and Dr. W. D. Robson, of the McIntyre Porcupine Mines and Dr. D. A. Irwin and Mr. J. H. Johnston of this department have continued their experiments on the prevention of silicosis by metallic aluminum.

The original experiments on the prevention of silicosis by aluminum have been repeated on large groups of rabbits. It has been established that in the lung the intimate mixing of one percent. metallic aluminum dust with quartz dust prevents the development of silicosis up to periods of over two years. Aluminum has been shown to effectively inactivate the quartz retained in the lung either when inhaled as a mixture with quartz or when inhaled separately. The inhalation of aluminum dust in large quantities over long periods of time showed no effect on the general health of the animals and no toxicity or damage to tissue. Metallic aluminum on being converted into hydrated alumina reduces the toxicity of quartz in three ways: (*a*) by flocculation, (*b*) by adsorbing silica from solution, but (*c*) chiefly by coating the quartz particle with an insoluble and impermeable coating.

Experiments have been under way for the past year to ascertain what effect aluminum dust might have on experimental silicosis once that condition is established. The findings to date, though not conclusive, strongly indicate that aluminum dust therapy arrests the usual progress of the disease and aids the lung to eliminate the quartz dust. The experimental work is being continued.

In conjunction with the Technical Silicosis Research Committee of the Ontario Mining Association, Dr. D. A. Irwin and Mr. F. E. Chase are investigating the effect of aluminum on tuberculous infection complicating silicosis. Experimental evidence to date indicates that the addition of minute amounts of silicic acid to cultures of tubercle bacilli increases the growth of the organism in rate and amount. Experiments are being carried out both in vivo and in vitro to determine if the presence of aluminum influences the localisation, spread and subsequent course of tuberculous infection present in a silicotic lung.

Three main problems—chemotherapy, phospholipids and protein analysis, have been under investigation by Dr. C. C. Lucas and his group.

The chemotherapeutic studies have been synthetic, analytical and biological in nature. The biological investigations include determination of the absorption and toxicity of the compounds and of their antibacterial activity. Mr. C. Marchant, under the supervision of Dr. Lucas, has prepared a series of derivatives of sulphanilamide. These have been turned over to Dr. P. H. Greey and his associates in the department of pathology and bacteriology, who have studied the antibacterial activity of these and other compounds in vitro and in vivo. The collaboration of the department of bacteriology has made it possible to study adequately this aspect of the problem. About twenty compounds have been prepared to date, several of which have promising properties. The studies are being directed particularly towards discovery of compounds effective against Staph. aureus and Bacillus tuberculosis.

Dr. Lucas has determined the rates of absorption and excretion and the blood concentrations of several of the new compounds following doses of different size given to rats. Chronic toxicity tests are also being conducted. The acute

toxicity of these new compounds in mice and guinea-pigs has been determined in collaboration with Dr. Greey.

Dr. Lucas has studied the chronic toxicity of sulphanilamide by feeding groups of rats on diets containing 0.5, 1.0 and 2.5% of the drug. Another group of rats have received the so-called conjugated form (N^4-acetyl sulphanilamide). The animals have been observed for one and a half years; some have been receiving the drug through four generations. Some inhibition of growth at higher dosage and defective spermatogenesis after six months on the drugs were the only signs of toxicity observed. Dr. D. A. Irwin has carefully examined sections from animals sacrificed at intervals but noted no other evidence of toxic action.

Dr. Lucas has collaborated with Drs. P. H. Greey and D. B. MacLaren (department of bacteriology) in some comparative chemotherapeutic studies, using mice experimentally infected with Strep. haemolyticus and Type I Pneumococcus. The relative antibacterial activity of sulphanilamide, dagenan, promin and hydroxyethyl apocupreine was investigated.

Miss M. E. Wheatley and Dr. Lucas have studied the splitting of prontosil in vivo and in vitro in an attempt to account for the curative effects of this dye, since the hypothesis that activity is due only to liberated sulphanilamide does not fit all the facts. A diamino-naphthol disulphonic acid, the second product which results from the fission, has now been isolated in pure form and its antibacterial effects are being studied in the department of bacteriology.

Miss Wheatley has also assisted Dr. Lucas to devise a semi-micro method for the quantitative study of small calculi (under 80 mg.) from the kidney or bladder. Utilising this procedure, a series of 100 stones collected by the department of urology at the Toronto General Hospital have been analysed. Dr. D. R. Mitchell, of that department, is collaborating in this study from the clinical side. It is hoped that the information obtained may be used to advantage in choosing diets for patients with a tendency to form stones, thus lessening the recurrence of urinary calculi.

Miss H. Macmorine attempted to devise a micro-method for estimating the drug metrazol (which is being widely used to treat schizophrenia) in tissue extracts. No suitable colorimetric procedure was found. Miss Macmorine later studied the determination of bilirubin and bromsulfalein (a dye used to test liver function) when they are both present in the same blood. She has also assisted Mr. Marchant in preparing new compounds for chemotherapeutic investigations.

Mr. J. Beveridge has continued his examination of the amino acids in the keratin of human hair. A suitable scheme of analysis for such a mixture has been worked out and data on eleven amino acids are now available.

Mr. L. B. Macpherson has fractionated the fatty material extracted from lungs of patients dying of pulmonary tuberculosis. The fractions are being examined chemically and tested for the effects they produce when injected subcutaneously and intraperitoneally. He has also continued his attempts to devise improved methods for the synthesis of phosphatides.

Mr. G. F. Townsend, working under Dr. Lucas, has made a chemical examination of Royal Jelly, the peculiar nutriment upon which queen bees are fed during larval and adult life. This mixture, interesting from the nutritional point of view, has been separated into four main fractions and each is being further studied.

Dr. Bruno Mendel has tested a large number of the higher aliphatic aldehydes for their effect on the metabolism of normal cells and tumour cells. Some of these aldehydes (heptaldehyde, citral) were found to inhibit the Pasteur reaction in tumour cells in minute amounts. The application of these findings to experimental tumours is under investigation.

Miss D. Mundell, working as an Eli Lilly Fellow, under the direction of Dr. Mendel, has made detailed studies on the choline-esterase in a large number of tissues of different plant and animal species. Whereas various amounts of

choline-esterase were found in all the animal tissues so far investigated, tumour cells did not show any esterase activity.

Miss Mundell's work towards purification of the choline-esterase resulted in obtaining a highly purified preparation from mouse liver. As larger amounts of the esterase were needed for experimental work on animals, Miss F. Strelitz developed a method for the purification of the esterase from horse serum. With this preparation, which was purified from 200-300 times, many experiments on animals were carried out, in order to determine the pharmacological effect of choline-esterase under various conditions. This work is being continued.

The work of the department has been aided to a great extent by grants from the following:

The Banting Research Foundation.
The Josiah Macy Jr. Foundation, New York.
The McIntyre Porcupine Mines, Limited.
The Ontario Mining Association.
The Scottish Rite Masons, Northern Jurisdiction.
The Eli Lilly Company, Indianapolis.
The Rockefeller Foundation, New York.

The department wish to express their thanks for this financial assistance. We also wish to acknowledge the gift of 200 milligrams of radium from Mr. Gilbert A. LaBine, in memory of his son, Leonard.

The Dr. James Page Rutherford Fellowship has been awarded to Dr. E. J. King of the British Postgraduate Medical School, London. Dr. King will spend three months working in this department.

Report of the School of Engineering Research

The Committee of Management of the School of Engineering Research herewish presents the annual report of its activities in research for the session 1938-39. This comprises a description of the researches which have been in progress, and by whom undertaken, as well as a general statement of the new arrangement of the work of the Committee and its policies.

During the past year considerable revision was made of the rules of procedure under which the Committee of Management of the School of Engineering Research operates. The chief changes introduced were, the addition of eleven members of the staff to the Committee, and the setting up of three sub-committees in order to more effectively supervise the selection of researches proposed by members of the staff, the decision of the funds to be expended upon each research, the consideration of progress reports, and publication of completed researches.

The following researches have been in progress during the past year:

Department of Civil Engineering

Under the direction of Professor C. R. Young
(with Professor Dunbar and C. E. Helwig)

Lateral Support of Steel Columns

The purpose of the investigation was to determine the extent of the required lateral supporting force for a wide range of steel columns, and to formulate design rules. This work has been completed and will be published in the near future.

Under the direction of Professor T. R. Loudon
(with H. S. Hiscocks)

Stress Effect of Cut Outs in Aeroplane Fuselages

The first part of this investigation was completed in June, 1938, and a paper presented at the Ottawa meeting of the American Society for the Advancement of Science. The final part has been in progress, and will be reported on in a few months.

Single Seat, Light Monoplane

An investigation is being carried on for the design of a single seat, light monoplane. The object of the research is to produce a reasonably priced, light monoplane.

Department of Mining Engineering

Under the direction of Professor F. C. Dyer
(with H. L. McClelland)

The Separation of Weed Seeds from Crop Seeds

The research on the cleaning of clover seeds has been extended to include wheat and other heavier seeds. The work so far has resulted in the development of a flotation process for the cleaning of clover seed. The process is now in commercial use in Canada, and has resulted in the reclaiming of much seed which was hitherto of very little value to the farm. The introduction of the process in the United States is at present under way, and inquiries have been received from several foreign countries. A further development is the Panel Seed Separator, which is a unique type of reciprocating table, and is a dry process, making delicate separations far beyond the possibilities of any other machine at present in use. This machine has been developed to a semi-commercial stage. Another dry process which has reached the advanced laboratory stage, is designed for the removal of some of the prohibited and more noxious weed seeds, which have proven to be inseparable from the clovers by other processes. The laboratory results, with respect to this process, have been very favourable.

These and other pressing problems connected with the elimination of weed seeds from clovers and grains will be continued.

Department of Mechanical Engineering

Under the direction of Professor R. W. Angus
(with Dr. Lord and G. Gung)

The Determination of Coefficients of Discharge over Dams

This research previously published in Bulletin No. 150, has been continued, with special reference to dams placed at an angle other than 90° to the axis of the stream. Also by means of a model dam, the flow for different heads and velocities of approach has been studied, also the exact contours of the water surface have been plotted. The effect of bridge piers set parallel with the stream axis, also placed normal to the face of the dam, has been studied. This investigation will be continued.

Under the direction of Professor E. A. Allcut
(with R. J. Birss and D. H. Hamly)

The Structure and Properties of Heat Insulating Materials

Studies have been made on the physical properties of heat insulating materials, with particular reference to their influence on the transmission of heat by conduction and convection.

The first part of this work, relating to infiltration of air and gasses through these materials has been published in bulletin Number 158. Micro examinations

were also made of fibrous insulating materials, and experiments are now in progress to determine the effect of vacua on heat transmission characteristics.

School of Architecture

Under the direction of Professors H. H. Madill and E. R. Arthur
(with H. Carver)

The Siting of Housing Projects in the Toronto Region

An investigation is in progress to determine suitable sites for the construction of low rent housing in the City of Toronto. The relative merits of the sites are compared and graphically illustrated. Three slum clearance sites are being examined. A detailed study of each area is being made, together with a re-planning scheme incorporating schools and other permanent features. As close relations must exist between the selection of housing sites and the ultimate policy for future development of the metropolitan area, the implications of each area under consideration are being illustrated.

Department of Engineering Physics

Under the direction of Professor K. B. Jackson
(with D. H. Hamly and W. A. Mohun)

Photographic Sensitometry

A sensitometer has been designed and constructed which is used to produce a series of exposures on the sensitive material under test, ranging from .001 seconds to 100 seconds in a logarithmic series. Work has also been completed on the calibration of light sources to produce an I.C.I. Standard Daylight, and on the construction of a constant temperature room and suitable equipment for the control of development conditions, and on the adaptation of a visual photometer for the measurement of density in the sensitometric strips.
(with L. E. Jones)

A Light Source for the Inspection of Specular Surfaces

The initial problem was to devise an artificial source of illumination for the inspection and grading of patent leather. This has been accomplished and the investigation extended to determine the necessary modifications for the inspection of calf skins and side leather, paint and lacquer surfaces.

Department of Chemical Engineering

Under the direction of Professor J. W. Bain
(with N. R. Fasken)

The Oxidation of Lignin

The oxidation of Willstatter Lignin by periodic acid has been studied quantitatively, and evidence has been obtained of the formation of a compound containing iodine and additional oxygen. Lignins of different origin are being similarly treated. The research is still in progress.
(with B. Marks)

The Action of Sodium Sulphide in Lignin

Considerable difficulty has been found in separating the products of this reaction. The research is still in progress.
(with B. Marks and R. J. Stevens)

The research on the oxidation of Lignin by periodic acid was continued during the session for the purpose of purifying and identifying some products of the reaction. Research is now in progress.

Under the direction of Professor M. C. Boswell
(with W. H. Rapson and K. W. Malcolmson)

The Synthesis of Oxalic from Cellulose

The conditions necessary to obtain a yield of 80% of the theoretical have been found, on the laboratory scale. Working on the pound scale, this same yield has also been obtained. An inexpensive method has also been devised for separating sodium oxalate from the sodium hydroxide fusion mixture, with practically no loss of either sodium oxalate or sodium hydroxide.
(with A. F. Graham, M. Adelman, and D. M. McBane)

The Synthesis of Inositol

Exploratory work has been carried out with five different methods for effecting this synthesis. Two of these appear promising. The work is in progress.
(with L. J. Rubin)

The Condensation of Glucose, Lactic Acid, and Urea

This condensation is being effected in stages. Three crystaline intermediate products have been isolated. The analysis of these, and their further transformations are now being studied.

Under the direction of Professor E. G. R. Ardagh
(with W. H. Bowman and A. S. Weatherburn)

The Reactions between Hypochlorite and Thiophene

The influence of the conditions upon the reaction between hypochlorite selections and thiophene has been further studied, and a paper published on the subject in the Transactions of the Society of Chemical Industry for 1939.

Under the direction of Professor R. R. McLaughlin
(with Dr. Beal)

The Action of Iodine on Rubber

It was found previously that compounds of iodine and rubber, containing a low percentage of iodine, can be prepared. The work of more definitely characterising these compounds was continued. The results will be published shortly. A study was made of the manner of addition of iodine to rubber. Similar study was made of other unsaturated hydrocarbons related to dipentene and isoprene, as the two latter are closely associated with rubber.
(with L. E. Horembala)

The Role of Copper in the Deterioration of Rubber

This is a continuation of the work carried out with Dr. Beal last year.

The action of kephalin in deterring the aging of rubber catalysed by copper is being investigated. Kephalin was found to diminish the oxidation action.

Under the direction of Professor E. A. Smith
(with J. P. Kirby and W. C. Macdonald)

Dehydrogenation of Soya Bean Oil

This research is in progress.

Department of Electrical Engineering

Under the direction of Professor H. W. Price
(with R. J. Brown)

Electrical Contacts with Small Operating Force

The combination of materials has been found for establishing electrical contact without flashing, and with very small contacting force.

Under the direction of Professor V. G. Smith

A Cathode Ray Oscillographic Wattmeter

Preliminary design work has been completed, and experimental work to determine some unknown factors will be commenced.

Under the direction of Professor B. deF. Bayly

The Analysis and Synthesis of Electric Wave-Forms

In general, this research is for the purpose, firstly, of finding more convenient means than have hitherto been available for delineating and recording electric wave forms, and secondly, to provide equipment for setting up artificially any desired type of wave form, either of a steady state or a transient condition. This research has been in progress during the past session, and is being continued.

Report on Research in the Faculty of Dentistry

Notwithstanding the lack of adequate funds for research in this Faculty the staff and graduates have been carrying on with very gratifying results.

Following the investigations of Dr. Harold K. Box on dental caries, a bulletin entitled "A Liquefying Amylase in Human Saliva, Amylopectin and Dental Caries" was published by Canadian Dental Research Foundation. Further research into the relationship of the amylolytic activity of human salivary enzymes and dental caries has been continued.

During the year, Mr. Fenton has proceeded with his studies on the bacterial and physico-chemical properties of cereal-grain products, as related to dental caries. The nature of the protective factors involved in caries immunity is being investigated on the basis of the amylolytic activity of the saliva on cereal-grain foods.

Dr. Frank M. Lott has now progressed in his study of glass as a denture base to the point of making a thorough clinical test of this material. A report has been made to the department of anatomy on a study of the anatomy of the mandibular joint and its relation to occlusion. A report on dentistry as applied to the defence forces of a country has been completed and forwarded to the Canadian Department of Defence.

Dr. Roy G. Ellis has made further progress in the field of electro-deposition of metals as applied to dentistry especially in the prosthetic branch.

During last July and August Dr. Ellis at the request of Bishop Fleming of the Diocese of the Arctic visited All Saints Hospital at Aklavik in the western Arctic. Incidental to dental service to the Eskimos and Indians, many observations were made of their dental conditions. Dr. Charles H. M. Williams will this summer visit the main land and islands of the eastern Arctic, making similar investigations. A comparison of the dental conditions of the Eskimos and Indians in these widely separated areas will be of much value. Dr. Williams has an appointment from the Federal Government as a scientific investigator on the steamship "Nascopie".

The Royal College of Dental Surgeons of Ontario has given financial support to research in this Faculty and this has assisted the following graduates to pursue the study of various dental problems.

Dr. E. C. Purdy and Dr. Arthur W. Ham have nearly concluded their investigation into the relationship of the mineral content of teeth to disturbances of the calcium and phosphorus metabolism.

Dr. M. N. Rockman was awarded the B.Sc. (Dent.) degree on his study of the effect of x-rays on blood, bone marrow and skin.

Dr. Wm. Garard has proceeded with his investigation on the relative toxicity of procaine and monocaine.

Dr. T. N. Scott has continued his study of the anatomy and histology of the semi-edentulous and edentulous mouth.

Dr. G. B. Shillington has commenced a study of teeth of pre-school children, with special reference to any relationship existing between dietary factors and time of eruption of primary teeth; dietary factors to include: breast feeding, Vitamin D, Vitamin C, cereals, vegetables, eggs. This research is being undertaken at the Hospital for Sick Children under the direction of Dr. F. F. Tisdall.

Dr. H. S. Austin is proceeding with a study of the enervation of the dental area with special reference to the difficulties in procuring local anaesthesia. His work this year has been in the department of anatomy under the direction of Dr. J. C. B. Grant.

Dr. F. D. Dempster is making a study of the age at which orthodontia treatment should be commenced, under the direction of Dr. C. A. Corrigan.

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(15) REPORT OF THE DIRECTOR OF UNIVERSITY EXTENSION AND PUBLICITY

(*W. J. Dunlop, Esq., B.A., B.Paed.*)

It has often been said that the function of University Extension is to serve the university's constituency and to comply with requests received, in so far as such service is within the recognised sphere of a university's activity. When that is the objective, it follows that there are new developments each year. During the session 1938-39, a class in marketing was established in which nearly four hundred men and women enrolled for a series of ten lectures. A three-day course was arranged for men and women engaged in the business of buying, selling, renting, and appraising real estate. Arrangements were made to conduct correspondence courses and to supervise examinations for the International Accountants' and Executives' Corporation as has been done for years for similar commercial organisations. Refresher courses were carried on in co-operation with the Department of Social Science.

The enrolment in courses and classes for the session was somewhat higher than in the previous year. It was made up as follows: Pass course for teachers, 747; evening tutorial classes, 3,208; Workers' Educational Association classes (in Ontario), 1,432; occupational therapy, 47; physiotherapy, 44; aerial navigation, 20; courses in pedagogy, 104; specialist courses, 10; short courses, 303; Canadian Credit Institute, 184; Chartered Life Underwriters' Association, 186; Certified Public Accountants' Association, 112; preparatory correspondence courses in arts, 138; correspondence courses in upper school and commercial subjects, 186; International Accountants' and Executives' Corporation, 9. Total 6,730. Of these 3,778 were men and 2,952 were women.

Extension Lectures are still popular; 175 of these lectures were given in 35 different centres in Ontario. This is our oldest form of extension service and it is being supplanted to some extent by more continuous instruction but it still has its place. To obtain an accurate estimate of the number of men and women who listen to these lectures is really not feasible, but the total runs annually into many thousands. Lectures were delivered in the following centres in Ontario: Aylmer, Belleville, Bowmanville, Bradford, Chatham, Collingwood, Dundalk, Dunnville, Espanola, Guelph, Haileybury, Hamilton, Hanover, Kitchener, Little Current, Lindsay, London, New Liskeard, Niagara Falls, North Bay, Oakville, Oshawa, Ottawa, Owen Sound, Parry Sound, Peterborough, Port Hope, Port Perry, Sault Ste. Marie, St. Catharines, Stratford, Sudbury, Toronto, Weston, and Windsor.

It might have been expected that the numbers enrolled in the pass course for teachers would have decreased sharply with the great and gratifying decrease in attendance in the Normal Schools of Ontario. But such has not been the case. The summer session and teachers' classes, held in the evenings during the winter session, continue to attract almost as many teachers, and others, as in previous years. However, it would seem certain that a decrease must soon come because the available supply is much less than half what it was a few years ago.

The Senate of the University, on the recommendation of the Committee on University Extension, has decided to discontinue summer courses offered to teachers with pass degrees who wish to become "specialists". Such teachers, if they are really in earnest, are advised to spend a year for this purpose in regular attendance at the University, as many now do. The summer courses of this type have never been satisfactory and only one of them is available during the coming summer session. The attendance has never been sufficiently large to justify the time and money expended on these courses.

Evening tutorial classes show a gratifying development. There were 52 of these and the subjects of instruction were: accounting, advertising, air conditioning, art appreciation, art of the theatre, cost accounting, dramatic art, economics, English, French, German, gymnastics, dancing and swimming, industrial and business organization, interior decorating, investments, Italian, journalism, lip reading, marketing, magazine writing, mechanical power transmission, mercantile law, metallurgy, modern international relations, music appreciation, nature study, parent education, philosophy, psychology, public speaking, purchasing, secretarial practice, Spanish, traffic and transportation, writers' workshop, and national and international problems.

That a greater service can be rendered to young men and women in the business world was clearly demonstrated by the success of the class in marketing. Already discussions have taken place in a meeting of the Committee on University Extension, looking toward a development of the facilities for instruction in subjects of value to those seeking to make successful careers for themselves in business.

Through the medium of the Workers' Educational Association classes were conducted in the following centres in Ontario: Brantford, Cornwall, Fergus, Fort William, Galt, Guelph, Hamilton, Kingston, Kitchener, London, Oshawa, Peterborough, Port Hope, St. Catharines, Sault Ste. Marie, Stratford, Toronto, Windsor, and Woodstock. The subjects of instruction were: applied psychology, Canadian economic problems, current economic events, current history, development of economic thought, discussion group, economic history, economic theory, English composition, experimental psychology, general psychology, history and development of trade unionism, labour history, literature, philosophy, political science, public speaking, science of society, sociology, and vital Canadian issues.

One important problem remains to be solved. There may be many other problems but one is, at the moment, of paramount importance. Can this University render any service to the farmers of Ontario? If so, what form can such service take? This University would be stepping out of its proper sphere if it undertook to conduct young farmers' clubs and music clubs as is done in one Province of this Dominion or if it led in the formation of co-operatives and credit unions as is done in two or three Provinces. Some voluntary philanthropic organisations in Ontario are endeavouring by means of recreation and by instruction in arts and crafts to arouse an interest in adult education. But can the University sponsor recreation even as a bait for academic education? It would appear not. This department tried an evening tutorial class in elementary economics for young men and women on the farms and it was reasonably successful, with an enrolment of 42 and a well sustained attendance. Will the day come when farmers will spend one evening a week in studying, under competent instructors, English literature, history, international affairs, psychology, or

allied subjects? When economic conditions improve, that day may come. At present the demand seems to be for entertainment or for instruction which brings a definite monetary return. In my opinion, that is a field into which the University cannot go. The Canadian Association for Adult Education is wrestling with this problem and may find a solution. There is much talk of "Education for Action", presumably action which will bring about improved conditions on the farms. The University can supply education but it cannot lead in action, whatever that may mean. And, apparently, the kind of education which is at present demanded is not the kind which the University is intended to furnish.

University publicity is closely inter-locked with university extension. During the year news items have been supplied to newspapers and periodicals and these "stories" have been widely used. The exhibit set up at the Canadian National Exhibition, in co-operation with the department of biology and the Royal Ontario Museum, drew continuously many thousands of visitors. The University receives an abundance of the best publicity.

During the year, I addressed the pupils of many Collegiate Institutes, High Schools, and Continuation Schools. The purpose was not to attract more students to the University but rather to outline the courses that are available and to explain how prospective applicants may obtain exact information. If possible, this service should be greatly expanded. The pupils in secondary schools do not know what courses are offered nor for what careers in life training may be obtained. Nor do their parents know. This department has published during the year several bulletins, written by members of the staff of the University, and these bulletins have been distributed to the principals of all secondary schools. If these publications are generally used as they are intended to be used, they should be of great assistance to pupils who are anxious to know what the University offers. But no means can be as effective as the human voice making the explanation and furnishing personal advice.

During the summer months, many parents bring their sons and daughters to me and ask for definite guidance regarding courses. This work requires a great deal of time, for each case must be dealt with individually but it seems to be thoroughly worth while.

(16) REPORT OF THE DIRECTOR OF THE DEPARTMENT OF SOCIAL SCIENCE

(*Professor A. E. Grauer, Ph.D.*)

Next year marks the twenty-fifth anniversary of the Department of Social Science, and the quarter century sees it established on firm foundations. The curriculum continues to expand in response to current welfare needs. The growing field of public welfare administration called forth new courses in housing, social insurance, public employment service, and the administration of provincial children's aid. In the last two courses we were fortunate in securing the co-operation of Mr. H. C. Hudson, of the Employment Service of Ontario, and Mr. B. W. Heise, Superintendent of Provincial Children's Aid, and Miss Fleming of his staff. The mental hygiene aspects of the curriculum were strengthened by two courses by Dr. W. E. Blatz, director of the Institute of Child Study. A new option was offered in industrial relations and received a very good reception. The assistance of Professor H. A. Logan of the department of political science, and Professor G. P. Cosgrave of the department of psychology, was invaluable in getting this option off to an auspicious start.

There were no additions to staff, but Miss Agnes McGregor's invaluable role in the development of the department was recognised in her appointment as assistant professor. The enrolment of students in the course showed a sharp

increase, the first year class being 45, as compared with 25 in the previous year. These numbers are a severe tax upon the present small staff and seriously raise the question of limitation of enrolment if staff cannot be increased. The full figures for registration are as follows: 46 in first year, 19 in second year, and 24 occasionals.

In cooperation with the department of university extension, two refresher courses in case work of two weeks' duration each were offered for qualified social workers in the field. Both these were given by Mrs. Margaret Millar, Case Consultant in the Cleveland Humane Society, and Field Work Supervisor for Western Reserve University, one in September, the other in April. Both received maximum registration and elicited widespread approval from the social agencies of Ontario. During the Easter term an evening course of eight weekly lectures was given for social workers and board members on problems of social welfare in Canada. This extra-curricular work has proven a decided stimulus to the welfare workers of Ontario and has strengthened the ties between the social agencies and the Department of Social Science.

(17) REPORT OF THE DIRECTOR OF THE SCHOOL OF NURSING

(Miss E. K. Russell)

This year has marked the end of the first phase of the life of this School and has ushered in the second. Having opened its doors in 1933 on a trial basis and with only a temporary grant toward support, the school has received during the year a gift from the Rockefeller Foundation of $250,000.00 toward endowment. Thus comes the beginning of a financial independence, and, following the acceptance of the endowment, a commitment to work which shall be permanent in character. In attempting the almost impossible task of meeting the demands laid upon the school, and while working through a year that has tried man's faith and courage to the utmost, we are glad that this annual report gives the opportunity to acknowledge such a generous gift. At no time could appreciation be felt more deeply.

In the six years since its origin, the school has grown rapidly in numbers and in variety of work. Starting with a total of 50 full-time students and 294 occasionals in 1933-34, this year the enrolment reached a total of 115 full-time students and 324 occasionals. Every year further demands have come for new varieties of work, and most of the requests are of the kind that cannot be denied, for they form part of the reasonable growth that follows quickly when an educational institution is able to give much-needed service. The school is serving as a centre for research in nursing education, a centre which seems to be appreciated greatly by the nurses throughout the whole of Ontario. In the present age of extraordinary growth in medical knowledge and practice, nursing schools are being forced to a sudden expansion and development for which they are little prepared. This special school has an opportunity to give special help: through its post-graduate courses it can prepare workers for the other schools, and in its new general training course it has particular freedom to demonstrate new methods. The hope for it is that it will give quiet strength and stability in the midst of the rather excited and uneven development that is being urged upon the profession. And the school should find the way to much better work in the preparation of public health nurses: long and careful study must be given to this problem.

Two members of the staff, Miss Emory and Miss Millman, now give teaching in two other schools of the University, namely, the Social Science Department and the School of Hygiene. In the coming year a third school will be added when students from the Institute of Child Study will receive lectures from the same members of this staff.

During the past twelve months, the students, apart from the Canadians, have come from fourteen different countries, including China, England, France, Greece, India, New Zealand, Japan, Panama, Poland, Portugal, South Africa, Turkey, United States and Venezuela. Some of these came for short periods of observation only, while others remained to do the full work of one or another of the certificate courses.

The needs for the future are as follows. First there should be more capital for endowment to increase the yearly income for the educational work of the school. After that, at some future date, funds must be sought for a new building. This can wait, but we should keep before us the fact that an adequate building would add very richly to the work of the school, particularly on behalf of graduate students. At present an educational opportunity of great value is being lost in that these graduates cannot live in residence. Students from all over this continent and from many other lands come and go, and yet, relatively, they see very little of each other, scattered as they are in rooming houses. Also a new building could add much strength to the educational work that is being done.

(18) REPORT OF THE DIRECTOR OF THE DEPARTMENT OF MILITARY STUDIES

(*Major M. Barry Watson, B.A.Sc., C.E., M.E.*)

I have the honour to report as follows on the work of this department during the academic year 1938-39.

Although general interest in military affairs was noticeably increased due to the international crisis of September, 1938, the enrolment in this department dropped slightly from the previous year, total registrations being 128, most of which were in the special voluntary classes (Courses 1b and 2b in the calendar).

During the past year, conditions under which university graduates are commissioned in the Regular Army and Air Force have been improved, and about 40 students and graduates made application for such appointments.

It is expected that the recent acquisition of new quarters for this department will not only enhance the value of the work carried on but will increase the interest of the student body in their responsibilities to their country.

The courses of study are being further revised in view of the good results apparent from last year's revisions.

(19) REPORT OF THE UNIVERSITY HEALTH SERVICE (MEN)

(*George D. Porter, M.B., Director*)

I.

The report of the year shows that there have been

Examinations:—

First Year Students	979
Second " "	704
Seniors	797
Total	2480

There were also sixteen re-examined by specialists.

This is the largest number so far examined due to the extra number of senior students coming in for health certificates.

The results of the examinations this year were very satisfactory. The physical condition of a large majority of students is excellent, only twenty being unfit for Physical Training.

This equals last year's very fine record.

Results:

Those found fit for Physical Training	94%
Those having some disability requiring corrective or light exercises	4½%
Those unfit for Physical Training	1½%

Twenty students were exempted for the whole year for the following causes:—

Heart Trouble	10	Tuberculous Hip	1
Operations	3	Arrested Tuberculosis	1
Infantile Paralysis	2	Bronchiectasis	1
Fractures	1	Osteomyelitis	1

The average height of our first year students is 5 ft. 9.35 inches, and their average weight 144.8 lbs. A slight loss in height over last year's record, but an increase in weight.

There are 162 first year students 6 ft. and over, with an average height of 6 ft. 1¼ inches, and an average weight of 160 lbs.

Improvement in the physical condition of the second year students is shown in the majority of cases. 26% of those below category A.I. in their first year, had their rating raised during the year, while only 4% in all categories had their rating lowered; these latter were lowered owing to illness or accident during the year. The average gain in weight was 4½ lbs.

The great majority of senior students coming in for re-examination also show improvement in their physical condition.

We find that among the 244, or 44% of the fourth year men who came in for examination, 224 of them either remained A.I. or had improved in health during their college course. Their average gain in weight in the four years was 8¼ lbs. while 20 of them had lost an average of 4 lbs. in weight and had their categories lowered.

We were very fortunate in having no serious outbreak of any infectious diseases during the year, and apart from the usual epidemic of influenza, the general health of the student body has been excellent.

There were 83 students enrolled in the special classes under Mr. Martin, for the correction of postural defects, and for certain disabilities, and 72 others for periods of from one to six weeks on account of injuries, or recent illness, which prevented their taking the regular physical training.

Dr. Charles Gossage again attended to a large number of students for injuries received on the campus, and in the gymnasium, as will be seen in his report to the Athletic Association. His work has proved very satisfactory.

Personal advice to a great many students, and lectures on personal hygiene to those in the first year taking physical training, were given by the Director of Health Service. These were well attended as they have been in previous years.

Lectures on First Aid were also given to the Foresters, and as usual a lecture on the University Health Service was given to the D.P.H. Students.

We have done 115 vaccinations during the year.

We are again indebted to Prof. Andrew Hunter, professor of pathological chemistry, for undertaking the supervision of the uranalysis, in connection with the physical examination of students. These examinations shewed that 8.2% of the students had albumin, and 4% had sugar, and these students were written to by the Director regarding the advisability of their seeing their own physicians about it.

We have again arranged for the X-Ray examinations of the mining students, and in this connection are indebted to Dr. Charles H. Hair, medical officer in connection with the mines, for his interest in the matter, and for his advice to the students.

Illnesses and accidents for which temporary absence from Physical Training were allowed.

Illness:

Colds	209	Jaundice	1
Influenza	133	Myalgia	5
Pharyngitis	17	Neuralgia	4
Bronchitis	7	T.B. Test	17
Laryngitis	9	Vaccination	4
Tonsilitis	5	Transfusion	2
Sinusitis	4	Mumps	1
Gastritis	9	Scarlet Fever	1
Local Infection	9	Hernia	5
Dental Trouble	7	Abscess	3
Epistaxis	6	Otitis Media	3
Migraine	2	Eye Trouble	4
	417		50

Operations

Appendicitis	4	Mastoid	1
Tonsils	3	Hernia	3
	7		4

Injuries

Sprains	48	Abrasions	14
Fractures	6	Contusions	15
Dislocations	9	Cuts	9
Concussions	5	Blisters	9
Burns	4		47
	72		

Skin Diseases

Furunculosis	15	Athlete's foot	3
Scabies	1	Impetigo	5
Eczema	1	Acne	4
	17		12

Total.....626.

During the year a very large number of students came into the Director's Office for medical examinations, advice, minor treatments, vaccinations, and medical certificates Etc. These calls averaged 1065 for each of the winter months.

The Director presented a paper on the University of Toronto Health Service at the International University Conference, which met in Geneva, Switzerland last July. This was published in the Universities Review, November, 1938.

(19) REPORT OF MEDICAL ADVISER OF WOMEN

(Dr. Edith Gordon)

II.

I beg to present the report of the Medical Adviser of Women for the year 1938-1939.

Physical Examinations:

Entering women students in University College, the faculties of Medicine, Household Science, Applied Science and Dentistry were examined early in the college year to the number of 216. These students are required to take two periods of physical training weekly. Of this number, 86% were physically fit for the work; 10% were placed in corrective classes because of postural defects; and 4% were exempted from participation in physical training, and required to report to the Medical Office for some substitute. The students from the faculties of Applied Science and Dentistry were excused from physical training because of the impossibility of getting from their respective buildings to the gymnasium

in the Household Science building, making the necessary changes in costume, taking the classes, and returning to their own buildings within the hour. These students reported twice a week to the Medical Office for walks or rest periods, and were given credit for this attendance.

Students from other years in all faculties, and from the other arts colleges, as well as the departments of social science, physiotherapy, occupational therapy, and the school of nursing, reported for physical examinations to the number of 339.

39 women of the graduating class in University College responded to a request to be reexamined in the spring term before graduation. Of these, 28 showed some physical improvement since their initial examination as freshmen; 5 showed no appreciable change; and 6 were in poorer physical condition than on entering college.

All students participating in competitive sports are required to present certificates of physical fitness to the secretary of the Athletic Association. 279 were examined for the various interfaculty and intercollegiate teams. These took part in the sports of tennis, basketball, hockey, badminton, skiing and swimming.

In addition to the physical examinations of the university women, 47 students from the Margaret Eaton School of Physical Training were examined.

Tuberculin Tests and X-Rays:

Entering women students are required to have an intercutaneous tuberculin test, and those who give a positive reaction, an X-Ray. 30% of the entering group gave positive tests. The subsequent X-Rays brought to light one early case of tuberculosis. This young woman is at present in sanatorium undergoing treatment.

I should like to take this opportunity of thanking Dr. Grant of the anatomy department for his courtesy in permitting the X-Rays to be done in his department. This arrangement has been most satisfactory.

Hearing Tests:

The Audiometer, so kindly lent last year by Miss Helen McMurrich for the making of group hearing tests, was again available this year, and 190 tests were made. The students who showed a manifest deficiency in hearing by this test, were retested individually by Dr. Perry Goldsmith. I am indeed grateful for his interest in this problem of detecting early defects in hearing, and his kindness in giving so much of his time to examining this group of 18.

Consultations:

Considerable numbers of students come into the Medical Office constantly for consultation regarding health problems; for treatment for minor ailments; and to report illness. At the time of the initial examination, certain students are asked to report back to the Medical Adviser for reexamination after a stated period. This group needing supervision numbered 69. 23 vaccinations were performed, and 164 urinalyses were made.

In addition to the intercutaneous tuberculin tests, Schick and Dick tests were given the students of the Department in Social Science, and diphtheria toxoid and scarlet fever antitoxin were administered to those showing positive tests.

During the final examinations in May, 55 students wrote one or more papers in the Medical Office. These students were too ill to write in the regular examination halls, and special arrangements were made to have them write under medical supervision.

Lectures:

A course of 25 lectures in Personal Hygiene and First Aid was given to the first year of the Diploma in Physical Education course. Four Health Talks were given to the entering women following the physical examinations, and based on their findings. The one on mental health was given by Dr. Ruth Franks. Four lectures on Personal Hygiene were given in the spring term to the students in the Public Health Nursing course.

Needs:

The outstanding need for all women of the University is adequate gymnasium and recreational facilities. It is impossible to stress this too much. The conditions under which games are undertaken prevents all but the greatest enthusiasts from participating in them. Practice courts must be found by the students themselves, and frequently are far removed from the University, and the hours when they are available, are most unsuitable. Healthful recreation cannot be fostered under present conditions, and the women who most need encouragement to learn physical skills are passing from the University without any opportunity for gaining them. Some healthful and pleasurable recreation is the right of each university woman, and the opportunity and equipment should be provided to make this possible. It is to be hoped that another year will not pass without the foundations of the Women's Gymnasium being laid.

Physical Examinations, 1938-1939:

University College (Entering)		178
(Others)	10	
(Graduating)	39	
		49
Victoria College First year	35	
Second "	19	
Third "	1	
		55
Trinity College First year	16	
Second "	7	
Fourth "	1	
		24
St. Michael's First year	9	9
Faculty of Medicine Entering		26
Faculty of Applied Science		4
Faculty of Dentistry		3
Social Science		31
Department Physiotherapy First year	20	
Second "	3	
		23
Department Occupational Therapy	24	
	4	
		28
School of Nursing Undergraduates First year	12	
Others	28	
		40
Graduates		71
Graduate School		7
Music, Art and Special		7
Ontario College of Education		3
		555
Margaret Eaton School	47	
		602

(20) REPORT ON ATHLETICS AND PHYSICAL TRAINING

(T. A. Reed, Mus.Bac., Secretary, Athletic Association)

(I) Men

I beg to submit herewith the report of the activities of the Department of Athletics and Physical Training for the session 1938-39 in which is incorporated the conduct of competitive athletics, both intercollegiate and intramural, entrusted by the Board of Governors to the University of Toronto Athletic Association.

During the session the special committee on physical training, which is composed of the senior members of the Athletic Directorate, discussed at length means whereby the course in physical training could be improved to the advantage of the undergraduates. On the recommendation of this committee our director of athletics, Mr. Warren Stevens, was appointed by the Board of Governors, director of physical education, and he has now been made responsible for the drawing up of the necessary programmes. The instructors, Messrs. Martin, McCutcheon, Winterburn and Zwygard, were in charge of the various classes and continued the work along the usual lines.

The intramural programme inaugurated three years ago again showed a distinct advance, 1813 men participating, out of an enrolment of approximately 3500 eligible male students, or, a percentage of 51.8 of the entire male enrolment. This is in addition to the number of students taking part in the various intercollegiate competitions. The intramural sports committee held weekly meetings under the chairmanship of Mr. K. A. Stewart, U.C. IV, and formed a valuable link between the student body and the Athletic Directorate.

A largely increased number of students made use of the gymnasiums and the swimming pool, this being attributed mainly to the continuation of the policy of the Directorate of opening the gymnasium wing during the evenings now made possible by the athletic fee paid by all students. The said athletic fee of $3.00 has enabled the Athletic Directorate to provide many privileges for the student body hitherto not possible. Free admission to rugby and hockey games, the outdoor skating rink, instruction in golf and figure skating and affiliation with golf and riding clubs were responsible for a distinct increase in the number of students taking part.

Physical Training

The number of students in the first and second years taking part in physical training was approximately the same as the previous session, the programme being based on the Danish system of gymnastics with a certain amount of apparatus and mat work included. The enrolment in the University of Toronto Contingent of the Canadian Officers Training Corps, which is allowed as an option for physical training, showed an increase in the popularity of this very valuable form of physical instruction.

Enrolment

Men students in the first and second years	1759	
From third and fourth years (being deficient in previous years)	13	
		1772
From this total must be deducted those:		
(*a*) With credit for two years physical training but repeating academic work	190	
(*b*) Exempt on medical and other grounds	40	
(*c*) Withdrawn from college during the session or registration cancelled	31	
(*d*) Failed to register	14	
		275

These 1497 first and second year men elected to take their Physical Training as follows:

			1497
In Physical Training classes		1013	
In the Canadian Officers Training Corps		228	
In Special Classes for those physically deficient		71	
In the following Intercollegiate and Interfaculty Sports (part-time):			
Rugby	183		
Soccer	47		
Track and Harrier	89		
English Rugby	11		
Lacrosse	58		
Volleyball	141		
Boxing, Wrestling & Fencing	107		
Swimming & Water Polo	88		
Indoor Baseball	157		
Basketball	185		
Hockey	165		
Rowing	4		
Gymnastics	27		
Tennis	1		
Figure Skating	8		
Jiu Jitsu	13		
	——	1284	
		2596	
Less those participating in two or more activities		1099	
		——	1497

There were twenty class periods each week in the gymnasium conducted by the three instructors, and twenty-nine classes in the swimming pool including the advanced class for those who had progressed beyond the "learn-to-swim" class. 170 awards were granted by the Royal Life Saving Society and 100 men taught to swim. Special classes were held for the 71 men pronounced unfit on medical examination, work being provided that was suitable to their limitations. In addition to these classes Dr. Porter gave a course of lectures on hygiene and artificial respiration which proved to be popular and beneficial.

Intercollegiate Athletics

The University of Toronto again held its own in the various branches of intercollegiate sport, winning the senior championships in tennis, track, English rugby, golf, swimming and diving, gymnastics, boxing and wrestling and fencing. In the senior basketball, there was a triple tie for first place between McGill, Western and Toronto, but on account of the lateness of the season no play-off was held. The following individual championships were also placed to our credit; namely, the McCall Cup in golf won by R. D. Reid, Dent. V; the fencing by A. F. Garcia, Ap. Sc. III; the Neil Buckley for swimming by L. Nelson Earl, Vic. IV; gymnastics by E. S. Macdonald, Med. V; The intermediate championships won were tennis, basketball, golf and harrier.

For the first time in ten years McGill University won the Yates Cup representing the championship in senior rugby, a win that was popular and welcomed by those that are interested in the development of intercollegiate competition.

In addition to competition in the Canadian Intercollegiate Athletic Union our teams entered into competition with players from the United States. In harrier they competed with Buffalo State College and Alfred University; in soccer, Buffalo State, St. Lawrence and Clarkson; in swimming, University of Rochester, Buffalo State, Penn State, Syracuse; in wrestling, Mechanics Institute, Rochester, University of Buffalo, St. Lawrence; in boxing, the U.S. Coast Guard Academy, the U.S. Naval Academy; in fencing, University of Buffalo, Wayne University, Lawrence Technical College, Detroit. These visits not only provide much needed experience in competition but are establishing good-will and friendly relationship with sister universities in our neighbouring republic.

Special mention should be made of the trip of the Hockey Club during the Christmas vacation which was conducted on a larger scale than in any previous

season. Before leaving they entertained the University of Southern California team at our own Arena and then, proceeding across the Continent, played Gonzaga University at Spokane, Washington; an exhibition game at New Westminster, B.C., and two games with Loyola College, Los Angeles. Returning East to play the American games in the international intercollegiate group, they met McGill and the University of Montreal in New York City in exhibition games, St. Nicholas Hockey Club in Brooklyn and the Boston Olympics in Boston, ending the trip with regular fixtures with Harvard at Cambridge, Mass. and Dartmouth College at Hanover, N.H.

Intramural Competition

The schedule below shows the wide-spread and active interest on the part of the students in intramural competition, a programme which has been materially developed during the past three years. The competition is keen for the many handsome trophies donated by friends of the University. This indicates an increase of 24 teams and 224 students in active competition. The intramural trophy for high points in competition was again won by the Faculty of Applied Science with 4342 points, Trinity College being second with 3327 points and Wycliffe College third with 3158 points. The number of students participating shows a distinct advance over the previous year, there being a net increase of 441 participants.

Series	Name of Cup	Winner	Interfaculty teams	Players
Rugby	Sir William Mulock	Victoria	9	250
Sr. Track	W. L. Rowell Memorial	Victoria		57
Jr. Track		Victoria		71
Soccer	Arts Faculty	Med.	9	158
Harrier	J. Brotherton	App. Sc.		62
Hockey	W. T. Jennings	Trinity	21	321
Basketball	Clifford Sifton	Sr. Vic.	29	411
Lacrosse	Dr. W. A. Dafoe	Victoria	13	154
Sr. Boxing, Wrest. & Fencing	Francis Davidson	App. Sc.		31
Jr. Boxing, Wrest. & Fencing		App. Sc.		76
Indoor Baseball	A. G. Spalding & Co.	Dent.	23	392
Sr. Swimming	A. M. Fitzgerald	App. Sc.		34
Jr. Swimming		App. Sc.		62
Individual Swimming	Durnan	G. H. Clawson, U.C.		21
Water Polo	H. P. Eckardt	Trinity	13	159
Indoor Track	Toronto Cricket Club	Victoria		76
Tennis	F. Y. McEachren	B. W. Hall, Vic.		49
Sr. Gymnastics	H. A. Wilson	Victoria		8
Jr. Gymnastics		Trinity		17
Volleyball	Victoria Staff	Wycliffe	23	315
Golf		Dent.		111
Rowing		App. Sc.		30
				2865
Less those participating in two or more sports				1052
Number of contestants				1813

Special Awards

The John C. H. Copp Memorial Trophy was this year awarded to Frank E. J. Sirdevan adjudged the worthiest member of this year's rugby team. The Don. M. Barton Memorial Trophy, awarded annually to the gymnast showing the greatest improvement during the year, was awarded to R. O. Brett, Dent. I. The T. H. Bickle Memorial Bursary established by the parents of an outstanding student in the class of '38 was by unanimous decision awarded to L. Nelson Earl of the graduation year of Victoria College.

A handsome bronze trophy was presented this year by the Massey Foundation to stimulate competition in boxing. Under the terms of the award drawn up by the Directorate and approved by the Hon. Vincent Massey, this trophy

is to be awarded annually to the outstanding boxer of the year and it was this year awarded to John Jacques Pigott, intercollegiate champion in the 165 pound class, Applied Science III.

The Promenade Symphony Concerts under the direction of Mr. Reginald Stewart now in the sixth year of operations continue to provide exceptional facilities for a large number of citizens to hear symphony concerts at a purely nominal figure. There were 24 concerts given with an average attendance of 4,920, the largest at one concert being 7,462. The construction of the building lends itself admirably in the matter of acoustics and with the extensive seating accommodation aids in providing a unique series of entertainment. Not only do the public benefit but the players themselves participate on a share basis from the proceeds of these concerts which, together with the broadcasting rights, amounts to a considerable sum for each member. The charge for the Arnea is kept at the lowest possible figure consistent with maintenance and overhead charges and it is a matter of pride that the University of Toronto can thus render such a valuable contribution to the musical life of the community.

The Athletic Directorate

The Athletic Directorate for 1938-39 consisted of Dr. J. A. McCollum (President), Professor T. R. Loudon, Professor S. Beatty, Dr. W. Easson Brown, Messrs. J. P. N. Holden (Vice-President), C. C. Gray, E. S. Jarvis, W. T. McGregor, D. W. Morison, W. C. Schwenger, and *ex officio*, Dr. G. D. Porter, medical director, Warren Stevens, director of athletics and T. A. Reed, financial secretary.

(20) REPORT OF THE DIRECTOR OF THE DEPARTMENT OF PHYSICAL EDUCATION FOR WOMEN

(*Miss I. G. Coventry*)

(II) Women

During the academic year 1938-39 there were 252 women students registered in the physical education classes and approximately 506 class periods of instruction were given by the physical director and her assistants Miss J. M. Forster and Mrs. M. Graham.

Required Physical Training: The required physical training class with an enrolment of 214 students was subdivided into ten class periods a week. This plan, as formerly, assisted principally in accommodating the students who presented varied academic time-tables and it also lessened congestion in the one small gymnasium and overcrowded dressing-room quarters.

The students enrolled in the regular classes were required to take final tests in general gymnastics and corrective exercises at the end of the session. The annual report of these examinations including the class attendance results of the students was submitted to the Registrar of the University.

Corrective and Remedial Classes: Class periods of corrective and remedial gymnastics were given to the students who were medically advised to take the special course arranged for their benefit and welfare. This essential part of health physical training was personally supervised by the director. When satisfactory results were obtained it enabled the students to return to the regular classes before the end of the second term.

Number of students from University College	188
" " " " Faculty of Medicine	6
" " " " " " Applied Science	3
" " " " " " Household Science	12
" " " " " " Dentistry	5
	214

Swimming: There were 270 students from all colleges, faculties and departments, and approximately 325 periods of instruction in elementary and advanced swimming and life-saving given by Miss A. Cochrane and Mr. A. L. Cochrane during a session of 7 months.

Number of students from University College	143
" " " " Victoria "	49
" " " " Trinity "	4
" " " " Faculty of Medicine	6
" " " " " " Household Science	13
" " " " School of Nursing	1
" " " " Faculty of Applied Science	5
" " " " Physical Education Course	24
Administrative Staff	25
	270

Four Year Diploma Course in Physical Education (with the Pass Arts Course): There were 24 students registered in this course and approximately 176 class periods of lectures and theory, and 274 class periods in practical subjects were given during the college year.

The women graduates who have been granted the diploma in physical education by the University of Toronto continue to be appointed physical directors or instructors in the Ontario schools.

(20) REPORT ON ATHLETICS FOR WOMEN

(*Miss A. E. M. Parkes*)

III.

I beg to submit the report on Athletics for Women in the University of Toronto for the year 1938-39.

The year has been most satisfactory both from the competitive and recreational viewpoints, although there has been no great increase in the number taking part in the various forms of sport. The Athletic Directorate much regrets that it has not been in a position to encourage the participation of more students in such sports as basketball, badminton, indoor baseball and swimming, due to lack of adequate gymnasium and pool accommodation, and in tennis in University College particularly where no courts are available.

In the intercollegiate field, the women of the University enjoyed their most successful year since intercollegiate competition was begun, winning the championship in all four regular leagues, tennis, badminton, swimming and basketball. The latter afforded particular satisfaction as it brought back to Toronto the much-prized "Bronze Baby" after an absence of five years. Undoubtedly the success of this team was largely due to its coach, Miss Beatrice Longley, Vic. '34, now in charge of physical education at Humberside Collegiate, who gave so generously of her time and experience throughout the season. An intermediate basketball team was also formed which gave an additional number of students the benefit of outside competition. An invitation from the Women's Ski Club of McGill University was received for a Toronto team to enter an international intercollegiate meet at St. Sauveur, Que. Three of our outstanding skiiers were able to make this trip, by permission of the Women's Athletic Directorate, and in spite of stiff competition, returned with the trophy denoting first place.

A very successful intramural programme was carried through in most of the sports, including tennis, golf, indoor baseball and basketball in the fall, and hockey, badminton, swimming and bowling in the winter term. A group of approximately twenty-five made use of the figure-skating instruction available at the Stadium under the athletic fee, and a larger number even than last year took advantage of the other facilities provided for skiing, riding and golf.

INTRAMURAL COMPETITIONS

Sport	Trophy	Winner	Competitors
Tennis	Curlette Cup	Victoria	36 (6 teams)
	Univ. Champion	Claire Walsh, Vic. IV	
Golf	Univ. Champion	Marion Walker, U.C. I	30
Baseball	Univ. Coll. Cup	Victoria I	28 (3 teams)
Basketball	St. Hilda's Cup	Univ. Coll. Jrs	145 (13 teams)
Hockey	Harston Cup	St. Hilda's	68 (5 teams)
Badminton	Badminton Cup	St. Hilda's	36 (6 teams)
	Univ. Champion	Mary Becker, St. H.'s IV	
Swimming	Interfaculty Cup	Physical Education	40
	Univ. Champion	Margaret Bailey, Vic. IV	
Bowling	Univ. Champion	Ruth Publow, Vic. II	40

Students taking part in one or more of the above activities were registered in University, Victoria, Trinity and St. Michael's Colleges, the Faculties of Medicine and Household Science, the School of Nursing and the Departments of Social Science, Physical Education, Occupational Therapy and Physiotherapy.

The Athletic Association has greatly appreciated the voluntary coaching given in basketball, hockey and baseball by various graduates and undergraduates, several of whom were registered in the College of Education. The unfailing cooperation of the men's Athletic Association has once more been of the greatest value to the women as has the continued helpfulness of the Superintendent's Office in the matter of the parking stations operated during the football season.

The Women's Athletic Directorate for 1938-39 consisted of Dr. C. C. Benson, President, Mrs. W. A. Kirkwood, Mrs. W. B. Elsley, Dr. E. H. Gordon, and the Misses J. M. Forster, M. H. B. Bailey, M. M. M. Conlin, E. J. McMaster, O. M. Mulhall, M. M. Pickering and H. M. Scott, and Miss A. E. M. Parkes, secretary-treasurer.

(21) REPORT OF THE WARDEN OF HART HOUSE

(*J. B. Bickersteth, Esq., M.C., M.A.*)

The Royal Visit

The outstanding event of the year and the most memorable in the history of Hart House was the luncheon given in the Great Hall on Monday 22nd May in honour of Their Majesties the King and Queen by the Lieutenant-Governor of Ontario and the Executive Council of Ontario. The use of the Great Hall was willingly granted to the Government for this purpose and the duty of the University and of Hart House was to follow the instructions of the Government committee which was in charge of all plans for the royal visit to Toronto and to do their best to see that the arrangements were satisfactorily carried out. The total number of guests attending the luncheon, including Their Majesties and their staff, was 479. Except for a cluster of flags over the doors by which the King and Queen entered and left the building there were no decorations inside or outside Hart House. Their Majesties arrived at Hart House at 1.10 p.m. by the south-west door, being met by the President of the University and Mrs. Cody and by the Warden of Hart House, and after signing the Visitors' Book proceeded to the Great Hall by way of the quadrangle accompanied by the Lieutenant-Governor and Mrs. Albert Matthews and Mr. Mackenzie King. His Honour the Lieutenant-Governor of Ontario presided at the luncheon and proposed toasts to His Majesty the King and Her Majesty the Queen who sat on either side of him. There were no speeches. The King sat immediately under the royal arms. Music was supplied by the band of the Seventh Toronto Regiment, Royal Canadian Artillery, which was stationed at the east end of the quadrangle. After a short rest Their Majesties with their staff and those in attendance left Hart House at 2.25 p.m. by the upper south-west door. Both

the King and Queen gave frequent proof that they thoroughly understood the idea underlying Hart House and expressed regret that lack of time made it impossible for them to make a thorough inspection of the building. Any success the luncheon enjoyed is in large measure the result of the excellent arrangements made by the Comptroller who managed this singularly complicated function with outstanding efficiency.

GENERAL

The total number of undergraduate members of Hart House for the past year was 3728 (excluding summer members) and the senior members (including faculty and graduate) was 766, making a total of 4494. There has been a substantial increase in the graduate membership which is a tribute to the Graduate Committee and to Mr. H. J. Sissons, Secretary of Hart House, who with the co-operation of Mr. T. A. Reed and Mr. J. E. McCutcheon has been able to arrange in the evenings many athletic activities which have appealed to graduates of all ages. In the first few weeks of term Hart House was used for many dinners and receptions for freshmen. Other dinners held in the Great Hall were the Hart House Committees Dinner, the School Dinner, the Commerce Club Dinner, the Warden's Christmas Dinner (to all undergraduate members of Hart House who cannot return home at that season), the Engineering Alumni Dinner and the University of Toronto Athletic Association Dinner. The usual number of dances were held in the building. This year for the first time the All University Fall Dance took the place of the Masquerade and was held in October, some 1650 people being present. This experiment proved extremely popular and will probably become a regular event. The proceeds of the dance have been spent in installing two specially designed lamps on either side of the south-west door of Hart House. St. Michael's College held an official dance for the first time in the history of the college and this took place in January and was a great success. The U.C. Follies, School Night and Alumni Night again drew huge crowds. The House entertained the men and boys of the University Settlement at a party just before Christmas and on the last Sunday in October the House was thrown open to the general public and many hundreds took the opportunity of inspecting the building. The Great Hall under the administration of Miss M. E. Ransom showed a substantial increase in attendance and the management of all dining-rooms in the House appears to have given general satisfaction to both undergraduate and senior members. The tuck shop has also shown a steady rise in business. Increasing use has been made of the barber shop which was redecorated during the preceding summer. In November the lighting system of the House with the exception of the Great Hall department was transferred from direct current to alternating current.

ART

For nineteen years art classes have been held in Hart House for any members who desire to attend them. Mr. H. S. Palmer who has directed these classes for the past seven years wished last fall to be relieved of his duties and the House is deeply grateful to him for the admirable instruction he has given to several generations of students. His place was taken by Mr. Gordon Webber who conducted classes in the art gallery and also in the arts and crafts room, the latter being chiefly used as an experimental laboratory. Projects of three-dimensional character in different media of clay, wire, paper, etc., were developed. The art class provided the decorations for the C.O.T.C. Ball. An outstanding feature of the exhibitions in the gallery this year was the fact that four of them were given by members of Hart House, namely (1) the exhibition of work done by undergraduates in their spare time without any direct supervision, (2) the annual exhibition of work by senior members of Hart House for which more pictures were submitted than ever before, (3) the annual exhibition of photography which

as usual was of high standing, 185 prints being submitted and 115 hung, and (4) an exhibition of work done in the art classes. Thus for eight or nine weeks there hung on the walls of the gallery work done by members of Hart House which in itself is proof of the way in which members are using their leisure in painting and drawing. Other exhibitions were arranged by Lawren Harris Jr., Charles Goldhamer, Clarence Chong, Lemoine FitzGerald, Professor M. S. Osborne, Goodridge Roberts, Kathleen Daly and George Pepper. Whenever possible the artists have been invited to speak about their own pictures and the large attendance at these discussions indicates that they fill a real need. Exhibitions of prints were arranged in the print room throughout the year. The Graduating Year presented "Ice Harvest" by Henri Masson to the House. Eleven pictures were selected from the Hart House collection for "The Century of Canadian Art" exhibition held in the Tate Gallery in London from October to January. This was the most important all-Canadian exhibition ever held in London and Hart House was the third largest exhibitor. Two pictures were lent by the Faculty Union, making a total of thirteen in all from this building. Three pictures have been lent to the California World's Fair and two to the New York World's Fair. Hart House owns fifty-six pictures and the fact that eighteen pictures from Hart House should have been chosen from these important exhibitions is in itself a tribute to the value of the collection of Canadian paintings which the Art Committee have been building up for many years.

Music

As has always been the case since their inception in 1922 the Sunday Evening Concerts proved extremely popular. Programmes were given by the Hart House String Quartet, J. Samoloff (pianist), George Lambert (baritone) and Dr. Frederick Silvester (Hammond organ), Norman Wilks (pianist), Emmy Heim (mezzo-soprano) with Sir Ernest MacMillan at the piano, Margaret Brown (pianist), the Hart House Glee Club with George Lambert and the Pipes Group and Viggo Kihl (pianist). The Friday Recitals which are attended by members only drew a steady attendance of music lovers. Those who appeared at these recitals were Sir Ernest MacMillan (pianist) and Elie Spivak (violinist), Wilma Stevenson Dohler (pianist), Reginald Heal (tenor), Viggo Kihl (pianist), the Canadian Hambourg Trio, Fredda Bradley (violinist), Muriel Donnellan (harpist) Jeanette Caillé (pianist), Frances James (soprano), Dr. A. M. Walter and a group of Upper Canada College boys with recorders, Frankish Styles (pianist), Harvey Seigel (violinist), Marguerite Homuth Craigie (soprano), Margaret Oliver (pianist) and Stephen Kondaks (violist). It is interesting to note that Frankish Styles is an undergraduate member of Hart House. It is all too seldom that members of Hart House are capable of giving these recitals and it was therefore particularly satisfactory that Mr. Styles was able to provide the programme on that occasion. Mr. J. Campbell-McInnes directed the Songsters for the twelfth year in succession. These provide a valuable opportunity for men to make themselves familiar with folk music. The sing songs under Mr. Ross Workman proved as popular as ever. The kindness and generosity of all the musicians who make the musical life of Hart House possible is deeply appreciated. Under the able direction of Dr. Charles Peaker the Glee Club have had an extremely successful year. On the last Monday before the Christmas vacation began the club gave a carol programme at lunchtime in the Great Hall and as a result of an audition by the C.B.C. on that occasion gave on the following day a coast-to-coast broadcast for a quarter of an hour. The Great Hall was full of undergraduates having lunch and for two minutes before the singing began an official C.B.C. announcer described the general setting of the hall. The programme which consisted of carols was much appreciated by the large circle of listeners. Besides the Sunday Evening Concert in February the club gave several other concerts in Toronto and also appeared at Alumni Night. At the present time the club

consists of ninety active members and is administered by the Glee Club Committee which is directly responsible to the Board of Stewards. Two years ago Professor H. R. Kemp organised a group of members who desired to make bamboo pipes and then learn to play them. Last fall more men joined the group and with the help of Professor Kemp, to whom Hart House is extremely grateful for the time and trouble he so willingly took, spent some weeks making their instruments. Regular rehearsals began in January under the direction of Mr. Weldon Kilburn and the group gave creditable performances at the Glee Club concert in February and also at Alumni Night. The Music Committee again co-operated in the arrangements for the production of Bach's St. Matthew Passion which took place in Convocation Hall in Holy Week under the direction of Sir Ernest MacMillan. A larger number of undergraduates than ever before attended this performance.

LIBRARY

Owing to the generosity of the Massey Foundation new shelves were installed in the library alcove this spring. This additional accommodation has done much to ease the pressure on shelf space for some years to come. Mr. Vincent Massey was instrumental in procuring for Hart House one of the small upholstered chairs used by those attending the Coronation service in Westminster Abbey. This has been placed in the library. The Library Committee gave serious attention to the lighting in the library and the reading-room which is thoroughly unsatisfactory and a new system should be installed as soon as the funds are available. About 115 books were added and many old books weeded out. Two "Library Evenings" were held, Mr. Bertram Brooker and Professor Gilbert Norwood speaking on their leisure reading.

DEBATES

Although there are signs that the interest in debating not only in Hart House but throughout the University is not as keen as it was some years ago there has never been lacking at Hart House debates an adequate number of speakers from the floor of the House and this perhaps is more important than large attendances. The resolutions at the five debates held this year dealt with Mr. Chamberlain's foreign policy, the maintenance of the British Empire, fraternities, the administration of the City of Toronto and federal-provincial relations. At the last debate the Hon. Norman Rogers, Minister of Labour, was present and wound up the discussion.

STUDENT CHRISTIAN MOVEMENT

The work of the S.C.M. has probably never been more extensive nor more valuable than has been the case during the past year. The outstanding event was the "Religion and Life Week" held from Sunday 5th to Friday 10th March. Dr. Howard Thurman, Professor of Theology at Howard University, Washington, D.C., spoke in Convocation Hall on the Sunday and on the following days gave five addresses at 5.15 p.m. in Wycliffe Hall. On each occasion large audiences heard Dr. Thurman deliver an effective challenge to undergraduates to accept Christianity as the guiding principle of their lives. Many other meetings were held during this week in the colleges and faculties and there is no question that this experiment which in actual fact amounted to a University mission has had a wide effect in developing a deeper sense of the religious life among a large number of undergraduates. The series of midday addresses held on Wednesdays in the music room attracted an average audience of 75 to 100 men throughout the winter. A well attended study group on "Youth and Marriage" met in Hart House under the Rev. J. D. Parkes up till Christmas. Outstanding speakers from England, Africa, India, China, Japan and other countries addressed undergraduate meetings in Hart House throughout the year. The Chapel in Hart

House was full on the six occasions that the Holy Communion was celebrated. The renovation of the Chapel which has been in progress for several years is now complete. Specially designed chairs have taken the place of the somewhat unsightly pews, a new carpet has been procured, the lighting system has been entirely changed, murals by Will Ogilvie cover the upper part of the walls above the panelling, all woodwork has been toned and two 15th century Florentine candlesticks together with a specially designed frontal and a curtain in place of a reredos are additional furnishings to the altar. All these improvements have been carried out with the personal assistance of Mr. and Mrs. Vincent Massey and their entire cost has been borne by the Massey Foundation. The S.C.M. and all members of Hart House are deeply indebted to Mr. and Mrs. Massey not only for the interest they have taken in these improvements in the Chapel but also for their practical support of the S.C.M. in other ways.

Theatre

The theatre has been extensively used by university dramatic organisations. The U.C. Players Guild, the Victoria Dramatic Society and the St. Michael's Dramatic Society have all produced plays this season and the Victoria Music Club gave four performances of "H.M.S. Pinafore". The University Drama Festival took place at the end of February when Trinity, Victoria and University College entered plays, the award being given to Trinity College. The University Drama Committee produced "Holiday" drawing the cast from members of the various college societies. This play was considered worthy of being entered in the Drama Festival which took place throughout the third week in March. The Faculties of Engineering, Medicine and Dentistry also made use of the theatre as did the Shakespeare Society, the University College French Club and the Alliance Française. Mr. Willard Thomson and his staff have given the fullest co-operation throughout the season.

Visitors

In addition to Their Majesties the following persons are among the large numbers who have visited Hart House during the past year: Lord Stanley (Secretary of State for Dominion Affairs until his death in October 1938), Peter Scott (artist), Mrs. Arthur Grenfell, Sir Cedric Hardwicke, Viscountess Mersey, Sir Firozkhan Noon, L. deG. Sieveking (B.B.C.), Miss Grace Hadow (Oxford), Lord Middleton, Fuad Mufarrij, Professor A. J. B. Wace, Leonard Brockington (Chairman of the C.B.C.), the Hon. Norman Rogers, Dr. Frank Aydelotte, Sir David Ross, Dr. Roscoe Pound, the Rev. Canon Charles Raven (Master of Christ's Church, Cambridge), Sir Gerald Campbell, André Maurois, the Hon. Mark Kearley, Maurice Genevoix (novelist), Lord and Lady Baldwin, Sir Geoffrey Fry, Colin Gilray (Melbourne), R. S. Lambert ("The Listener") and Lt.-Commander Peter Dawnay. The members of Their Majesties' staff who lunched in the Great Hall were: Mr. A. F. Lascelles, Captain Michael Adeane, The Earl of Airlie, the Earl of Eldon, Lady Nunburnholme, Lady Katherine Seymour, Lt.-Colonel the Hon. Piers Legh, Commander C. Abel-Smith R.N., Surgeon Captain H. E. Y. White R.N. and Mr. George F. Steward.

Committees and Staff

The Board of Stewards and the Standing and Special Committees have met regularly throughout the year and any success that Hart House may have enjoyed is the result of the wise and enthusiastic direction they have given to its affairs. Senior members of these committees, both faculty and graduate, have once more laid the House under a great debt of gratitude by the active support which they so willingly give. Professor C. Lewis, Professor H. R. MacCallum, Mr. W. H. Bilbrough, Mr. J. L. Stewart and Mr. E. A. Ricker are retiring this year from the Library, Art, House, Debates and Glee Club Committees respec-

tively and Hart House is extremely grateful for the valuable contribution they have made to the life of the House. Mr. C. R. Delafield accepted a position with the C.B.C. after six years of admirable work as secretary of Hart House and Mr. H. J. Sissons, a graduate of Victoria College, was appointed in his place. Mr. D. L. Emond, assistant secretary of Hart House, having decided to continue his studies at Rochester University, was succeeded by Mr. E. A. Wilkinson, also a graduate of Victoria College. Mr. Emond who served Hart House as a member of the staff for twelve years is greatly missed. There has been the closest co-operation with the Athletic Directorate and the Students Administrative Council and Hart House owes much to Mr. T. A. Reed and Mr. E. A. Macdonald.

Finally the Warden desires to place on record his sense of profound gratitude to the Comptroller and the Assistant Comptroller of Hart House as well as to Professor H. Wasteneys and all senior members of committees for the way in which they carried on his work as well as their own during the year 1937-1938 when he was absent from Hart House for twelve months owing to ill health.

(22) REPORT OF THE DIRECTOR OF THE CONNAUGHT LABORATORIES

(R. D. Defries, M.D., D.P.H., Acting Director)

It is a great regret that, owing to his being temporarily absent on account of illness, Dr. FitzGerald is deprived of the pleasure of recording the activities of 1938-39 which mark the completion of the first twenty-five years of the work of the Connaught Laboratories. It was between September 1913 and April 1914 that Dr. FitzGerald founded and established the Antitoxin Laboratory which eventually became known as the Connaught Laboratories; and his original expectation that the University of Toronto would assume responsibility for this undertaking was realised on May 1, 1914, when the University officially took over the laboratory which he had established. Resulting from Dr. FitzGerald's vision and leadership during these years are the Connaught Laboratories as they stand to-day.

During this quarter-century, Dr. FitzGerald has given himself to the development and maintenance of facilities whereby the essential life-saving serums and vaccines might be made readily available throughout Canada to every person needing them, particularly through the provincial departments of health. This undertaking has involved not only the preparation of products of the highest quality but also their distribution at prices which would permit governmental authorities to undertake their distribution. Important as these objectives have been, they have not overshadowed the primary objective of conducting research. From the commencement of the work in the University, Dr. FitzGerald believed that the members engaged in the work of the Laboratories should also, as far as possible, be associated with the teaching of preventive medicine. The Connaught Laboratories and the School of Hygiene as constituted today are tangible evidence of the wisdom of this plan. That the School of Hygiene was established and endowed at the University of Toronto with the munificent aid of the Rockefeller Foundation reflects an outgrowth of the intimate relationship which Dr. FitzGerald foresaw between the conduct of research in preventive medicine in all its branches and the provision of suitable facilities for post-graduate instruction in public health. From the inception of the work of the Connaught Laboratories, the services of the Laboratories have been available to all of the provinces and territories of the Dominion of Canada. These services find ready acceptance and appreciation with the result that the Laboratories have always operated as an institute of medical public-service for the whole of the Dominion. The establishment of the Western Division of the

Laboratories in the University of British Columbia in 1935 for the study of research problems which could most advantageously be undertaken in Western Canada provides an illustration of the Laboratories' functions in serving the Dominion's needs.

Section of Bacteriology and Immunology

Under the direction of Professor Donald Fraser, a number of important investigations have been continued and certain projects initiated. Of special importance are the studies which have been continued relating to the immunity conferred by diphtheria toxoid. Since the commencement of the distribution of this product for the protection of children against diphtheria, sufficient toxoid for the protection of 3,500,000 persons has been distributed by the Laboratories. The immunity studies referred to relate to the determination of the duration of the immunity and to other essential factors. One of the studies relates to a group of 200 children, observations having been made each year since the group was immunised in 1934. The results of this study show the effectiveness of diphtheria toxoid given in three doses. It has provided accurate information concerning the gradual loss of protection which occurs. Because of this fact, the recommendation is being made that an additional small dose of diphtheria toxoid be administered after an interval of four or five years. Through the co-operation of the medical officers of health of Toronto, Hamilton, and St. Catharines, observations were made of children who had received diphtheria toxoid five years ago. Approximately 500 children have been studied and important information obtained supporting the observation that an additional dose of diphtheria toxoid should be given to children immunised in early childhood within an interval of five years. Such observations relate to municipalities where the incidence of diphtheria is low and the immunity is not augmented by exposure to diphtheria infection. Dr. A. R. Foley and Dr. P. Poliquin of the Ministry of Health of Quebec have co-operated in this undertaking.

Dr. Helen Plummer has reported on the preparation of perfringens toxoid, the purpose of which is to confer immunity against gas gangrene. The occurrence of tetanus and gas gangrene among troops in time of war presents a serious problem. The value of tetanus toxoid for conferring immunity against tetanus has already been established. During the Great War, prophylactic injections of tetanus antitoxin were used to prevent the development of tetanus. Since then, the development of tetanus toxoid which would confer immunity has been demonstrated and would probably be used to confer protection. Further studies are being made by Dr. Plummer regarding tetanus toxoid.

Dr. Frieda Fraser has made further progress in her researches in the immunisation of children against scarlet fever. The value of certain observations made by the Scarlet Fever Committee in the United States are being studied. Dr. Plummer and Dr. Fraser are continuing their studies of the antitoxin content of the sera of children immunised against scarlet fever. Further work has been conducted in isolating, grouping, and typing field strains of haemolytic streptococcus.

Dr. M. H. Brown has extended his investigation of the Salmonella group of micro-organisms and has received cultures from laboratories in various parts of Canada. To permit of the identification and classification of micro-organisms of this group, international action has been taken and a centre of study established in the Danish State Serum Institute in Copenhagen. Through this international centre, standard sera and cultures are being made available to national centres established in various countries. The Connaught Laboratories has accepted the invitation to act as the national centre for Canada. During the year, 828 cultures have been received from various parts of Canada and studied. No new types have been found. Valuable information is being obtained concerning the relative incidence of paratyphoid alpha and beta. Such information has definite

practical value in determining the composition of the protective vaccine for the prevention of typhoid and paratyphoid fevers. As a result of observations made by Dr. James Craigie of these Laboratories, modifications of the method of preparing typhoid-paratyphoid vaccine are being carefully studied and as a result also of these observations, preparation of a serum for the treatment of typhoid fever is being investigated. In the field of tuberculosis, studies have been continued in tuberculin testing. In co-operation with the Department of Health of Ontario, observations have been made and a special dilution of tuberculin has been made available for distribution in Ontario. Observations have also been made on the value of the newly introduced patch test which obviates making a hypodermic injection in children in carrying out the tuberculin tests.

Dr. Ronald Hare has progressed in his researches on influenza virus. The antigenic analysis of different strains of influenza virus, employing both serological methods and active immunisation, has been continued. Experiments have also been continued on the passive immunisation of mice infected with influenza virus. By means of suitable serum tests, the changes in the immunity of a group of persons living in Toronto are being followed. These persons have been studied since January 1937 and have been observed through two outbreaks of influenza. There is evidence that the immunity rises after infection and falls relatively quickly.

Active work has been continued by Dr. L. Farrell and Mr. R. J. Wilson in the investigation of staphylococcus toxin and antitoxin. In co-operation with the Hospital for Sick Children and the Toronto General Hospital, more than 600 human sera were studied as relating to the presence of staphylococcus antitoxin. Methods for improving staphylococcus toxoid and antitoxin are being developed. During the year, three outbreaks of staphylococcal food-poisoning involving more than 150 persons in Hamilton, Ontario, have been investigated. The studies made have indicated the character of such outbreaks and it is recognised today that such poisonings are probably much more frequent than had been thought previously.

Dr. Nelles Silverthorne has continued his important studies relating to the protection of children against whooping cough by using whooping-cough vaccine prepared from freshly isolated cultures. Extensive clinical observations are being made in co-operation with the Hospital for Sick Children, Toronto. In co-operation with the hospital also, clinical observations have been made which have indicated the value of a serum prepared by him for use in the treatment of patients suffering from influenzal meningitis. Studies relating to the important problem of human carriers of meningococci have been continued and valuable data obtained.

Section of Chemistry in Relation to Hygiene

Under the direction of Dr. P. J. Moloney, studies of diphtheria toxoid and Schick-test toxin have been continued, as well as the investigation of the detoxifying power of bile. Mr. M. D. Orr has studied intensively a number of problems concerning alum-precipitated diphtheria toxoid. He has been able to show a relation between concentration of alum and antigenicity of alum toxoid. The stability of alum-precipitated toxoid has also been investigated, fifteen different lots having been observed for three years. Certain difficulties relative to the preparation of alum toxoid from Taylor broth toxoid have been investigated and overcome. Dr. Edith Taylor has prepared a new Schick toxin which is more suitable for the Schick test than the toxins heretofore used. This product has been made available for general use. Investigation has also been made of the Taylor broth for the growth of diphtheria bacilli and for the preparation of a potent toxin. Dr. Moloney and Mr. Orr have continued their studies of the detoxifying effect of bile on diphtheria toxin and of the possibility of recovery of the "labile" and "stable" factors from bile samples. Mr. A. Birks, under

Dr. Moloney's direction, has investigated the purification of the "stable" factor associated with the detoxifying mechanism in ox bile.

Section of Viruses

Continued progress has been made under the direction of Dr. R. D. Defries. Dr. James Craigie has continued a detailed study of vaccinia virus. Further investigation of the serology and immunology of this virus has been concerned mainly with the antibody present in the blood of immune animals which neutralises the virus. The main obstacle to further work on this important antibody arise (*a*) from the complexity of vaccine virus which produces other antibodies as well when infection occurs, and (*b*) the present lack of any practicable and accurate method of measuring vaccinia neutralising antibody. The chief difficulties involved in titrating this antibody by the intradermal method are due to (*a*) the difficulty of titrating the infectivity of the virus with a sufficient degree of accuracy, (*b*) the failure of the immune serum to neutralise 100 per cent. of the virus exposed to it, and (*c*) the local passive immunising effect of strong concentrations of antibody at the site of inoculation which thus obscures the percentage of virus which has escaped neutralisation *in vitro*. Dr. Craigie, and Dr. A. S. Lazarus under the direction of Dr. Craigie, have been engaged in attempts to elaborate a practicable method of titrating vaccinia neutralising antibody which will adequately circumvent these difficulties. Dr. Lazarus has also been engaged in a parallel study of neutralising antibody using the chorio-allantoic membrane of developing chick eggs for the titration of residual virus.

In connection with the histological study of vaccinia infection, Dr. Craigie has improved his methods of demonstrating intracellular vaccine virus in fixed tissue sections and devised a staining method in connection with ultra-violet photomicrography. Important findings have been recorded as a result of the introduction of this method. Dr. Craigie has been successful in developing a specific complement-fixation reaction with rabies virus. This gives encouragement in the development of methods for the titration of specific *in vitro* reactions with other neurotropic viruses. He has continued to extend his observations on Vi phages of *B. typhosus* and his findings in regard to the occurrence of specific types of byphoid bacilli are attracting much attention.

Studies of rabies virus have been continued by Dr. Defries. The tissue culture studies of rabies virus have been facilitated greatly by the development of the complement-fixation test by Dr. Craigie, permitting the rapid identification of the presence of virus. The limitations of the present method of preparation of the rabies preventive treatment are recognised and study is being made of methods for the improvement of the vaccine used.

Dr. N. E. McKinnon and Dr. Mary Ross continued studies of mortality in the older age-groups and have published their findings concerning the trends of mortality in heart disease and cancer. Dr. McKinnon has also published a careful analysis of the mortality from heart disease, discussing the subject from the standpoint of public health. Dr. Defries, Dr. Ross, and Dr. A. H. Sellers presented the findings of a survey of diabetes deaths in Ontario. A statistical study of the incidence of venereal diseases as reported by the various provinces was conducted by Dr. M. F. McGavin with the object of obtaining a greater degree of uniformity in the statistical returns of these diseases. An analysis of expenditures in public health by all municipalities in Ontario was undertaken by Dr. Defries and Dr. L. E. Ranta. This study is being continued and data are being obtained which are of great value in the discussion of public health administration. Dr. Mary Ross has collaborated with Dr. D. T. Fraser and Dr. McKinnon in further studies of the protection afforded to children against diphtheria by the use of diphtheria toxoid.

Section of Physiological and Biochemical Researches

During the past year, research work has continued on Insulin. Dr. A. M. Fisher has investigated many problems connected with the routine preparation of Insulin. Mr. R. G. Romans, Dr. A. M. Fisher and Dr. D. A. Scott have been engaged in the development of a process for the regular routine preparation of large quantities of zinc-insulin crystals. Dr. Scott has continued the researches pertaining to the chemistry of Insulin. Among the problems investigated have been the action of ammonia on alcoholic solutions of Insulin, and the action of aldehydes and acetone on Insulin. Other research work has involved the study of the efficacy of various solvents in the extraction of Insulin from the pancreas. Arising out of microscopic examination of Insulin crystals, Dr. Scott and Dr. J. Craigie have prepared a moving picture film showing heretofore unpublished findings on the form of the crystals.

The work on heparin and thrombosis has been extended and it can now be shown that the large mural thrombi, i.e. masses of blood cells on the inside of the chamber of the heart, can be produced at will in dogs and this formation can be completely prevented by the administration of heparin. This work is an extension of that reported last year, the results of which showed that coronary thrombosis in dogs could be completely prevented by heparin. These problems have been studied by Dr. D. Y. Solandt, Dr. Reginald Nassim, and Dr. C. H. Best.

A new research initiated in the department of physiology and carried on in part in the department of physiological hygiene, has been the study of the effect of diet upon the Insulin content of pancreas. Diets rich in fat cause a very marked lowering of the Insulin content of the pancreas of rats. This is a particularly interesting observation which opens up the whole field of the relation of diet to the hormone content of glands. Dr. R. E. Haist, Miss Jessie Ridout and Dr. Best have conducted these experiments.

Dr. D. L. MacLean and Dr. Ruth C. Partridge have continued their investigations on ventilation and have studied the factors concerned in acclimatisation. Dr. MacLean has been responsible for a great deal of the histological work on coronary thrombosis and intramural thrombi. He has just finished a study of the tissue changes occurring in ascorbic acid deficiency in guinea-pigs. This was part of a study of vitamin C deficiency made by Dr. E. W. McHenry and Miss Margaret Sheppard. During the past autumn and winter, Dr. MacLean has been in large part responsible, under Dr. D. T. Fraser, for the tuberculin testing and immunisation against diphtheria, scarlet fever and typhoid fever, of the medical students.

Mr. L. B. Jaques, working at the Farm Section, has made a number of important advances in the preparation of heparin. New methods have been evolved which provide higher yields and it has been possible to show that the tremendous increase in blood clotting observed in anaphylactic shock is due to the liberation of heparin from the liver. This heparin has been isolated in crystalline form.

In continuation of work on the relation of histamine to adrenal insufficiency, Dr. G. A. McVicar has found that adrenal cortical extracts inactivate histamine *in vitro*. Since adrenalectomised animals are abnormally sensitive to histamine, the inactivation may have considerable physiological importance.

Dr. E. W. McHenry and Miss E. G. Gavin have continued the study of the relation of the B vitamins to fat metabolism. Convincing evidence has been secured in rats and in pigeons that vitamin B_1 causes a synthesis of fat from carbohydrate; the fat thus formed is a relatively saturated glyceride. Fat synthesised in the liver is caused to leave that organ by the administration of choline and will accumulate in the body if riboflavin and vitamin B_6 are furnished.

Dr. D. G. H. MacDonald and Dr. McHenry have been concerned with a possible effect of a deficiency of vitamin B_1 upon the size and tonus of the large bowel. The present evidence indicates that this deficiency has no such effect.

They have also studied the bradycardia produced in rats by a deficiency of vitamin B_1 and have shown that the regulation of heart rate is affected by a relation between the vitamin and the metabolism of foodstuffs.

Miss Sheppard and Dr. McHenry have extended the investigation on the physiological effects of ascorbic acid. In collaboration with Dr. E. Fidlar of the department of physiology, it has been shown that a deficiency of this vitamin in guinea-pigs causes an increase in total metabolism. Grateful appreciation is expressed to the Banting Research Foundation for grants to Miss Sheppard and to Dr. MacDonald.

Under the auspices of the Canadian Council on Nutrition, with financial assistance from that organisation, a survey of dietary habits among people with family incomes between $1,500 and $2,400 was undertaken. Miss Flora Webster is responsible for the collection of data; Miss Jean Patterson and Miss Lillian Barber are concerned with necessary calculations. Miss Patterson is also doing analytical work on Canadian foods. Analytical information has been supplied to two other laboratories doing dietary surveys and to the Canadian Council for the preparation of food tables. Miss Patterson has drawn up a low-cost family dietary which has been found useful in educational work among housewives.

Dr. H. M. Barrett has determined the fate of trichlorethylene in the body. This substance is used in industry and produces certain toxic effects. Dr. Barrett's work may be of assistance in eliminating some of these hazards. In collaboration with Miss Ridout and Dr. Best, Dr. Barrett has continued his studies on fat metabolism using heavy water to earmark the fats so that they can be followed in the body. Dr. MacLean has conducted the histological aspects of this study. In co-operation with Dr. J. G. Cunningham and Dr. L. B. Leppard of the Provincial Division of Industrial Hygiene, surveys of two plants using carbon tetrachloride were made. A method developed in this laboratory for the analysis of carbon tetrachloride vapour in air was utilised.

Farm Section

Under the direction of Dr. N. E. McKinnon, the work of the Farm Section in the preparation of various biological products and in research has been most effectively conducted. The products prepared include: diphtheria, tetanus, scarlet fever, perfringens, and staphylococcus antitoxins, anti-meningococcus and anti-pneumococcus sera, diphtheria toxoid, and smallpox and rabies vaccines.

The results of continued trial of rabbit anti-pneumococcus serum indicated the superiority of this over the concentrated serum from the horse. Accordingly accommodation for 1,500 rabbits was provided and production of practically all specific types of anti-pneumococcus serum begun. By the early months of 1939, however, just when efficient production was under way, clinical experience with the chemical sulphapyridine showed such apparently good results that the probability of wide use of serum became remote. Production thereafter was restricted to small quantities of the common types. The preparation of the anti-pneumococcus rabbit serum involved a very large amount of work. Large quantities of pneumococcus antigens had to be prepared and the sera tested. This work was conducted under the direction of Dr. J. M. Corkill. With Dr. R. C. French, Dr. Corkill was able also to undertake an investigation of the treatment of experimental pneumococcus infections with sulphapyridine alone and in combination with specific sera.

During the year, a considerably larger quantity of smallpox vaccine was prepared, and in addition a quantity of veterinary rabies vaccine was prepared and sent to Trinidad for use in controlling an outbreak of rabies among cattle. The preparation of diphtheria toxoid continues to be one of the most important undertakings of this section. During the past year, approximately 1,000 litres of diphtheria toxoid was prepared, an amount sufficient for the immunisation of approximately 500,000 children.

Dr. G. D. W. Cameron, in addition to his supervision of several of the biological products including scarlet fever antitoxin and anti-meningococcus serum, has continued the study of the flocculation of scarlet fever toxin by the antitoxin, but there are many phases of this problem still requiring investigation. The cause of double zones of flocculation, the significance of such zones, the possibility of eliminating interfering zones, the relationship of flocculation to neutrality, the relationship of the value as determined by flocculation to the value as determined by skin tests and by lethal tests, and the possible relationship of zones of flocculation to different types of toxin, require further investigation.

Dr. C. Siebenmann has been successful in obtaining satisfactory diphtheria toxin from veal broth and in quantity sufficient to meet the needs. Every effort is being made to improve the quality of the product. A large part of Dr. Siebenmann's time has been devoted to the production of diphtheria toxin and to the study of the influence of iron and other constituents of the medium on toxin production. His findings in regard to the influence of silver on bacterial growth and the use of silver foil as an indicator of hydrogen sulphide have been published. Dr. Siebenmann has also continued the investigation of the antigens and haptenes of meningococcus. He has shown that the antibody as titrated by estimating the immune nitrogen *in vitro* does not necessarily coincide with the potency titrated biologically.

The concentration of antitoxins is one of the most important activities of the Farm Section. In 1936, a new method of concentration based on a digestion process was introduced and the method patented by one of the commercial companies in the United States. Dr. French has made an intensive study of all methods of concentration including the digestion process. Arrangements are being made by the Connaught Laboratories so that the digestion method may be used.

Dr. French has prepared specific polysaccharides from pneumococci, types I, II, III, V, VII, VIII, and XIV, and has studied further the antigen-antibody union, comparing the values obtained by chemical titration of the combining nitrogen and the value shown by mouse protection tests. Similar studies have been conducted by him relating to the diphtheria antigen-antibody union, and his findings are of very real significance in any consideration of the fundamental nature of antibodies.

Under Dr. Arthur Charles, heparin production proceeded most satisfactorily. At the New Year, Dr. Charles was given leave of absence in England for advanced study with Professor Todd in Manchester. Mr. Jaques of the department of physiology has supervised heparin production and research in Dr. Charles' absence in a most satisfactory manner. In addition, Mr. Jaques has investigated other sources and other methods of extraction of heparin and has begun work on the extraction and titration of vitamin K.

Dr. J. M. Corkill, who joined the staff in July 1938 as bacteriologist, has had important responsibilities in carrying the cultures, preparing the antigens and titrating the mouse-protective antibody of the many types of pneumococci and the meningococci. Along with the heavy burden of routine work, he has carried on a thorough investigation, from the bacteriological side, of the factors producing discolouration of antitoxin.

Dr. E. G. Kerslake, besides supervising all immunisation, bleeding, care, and disposal of horses, has carried on his study of the antitoxin response of horses to tetanus toxoid and in co-operation with other members of the staff has continued the study of the immunity of the central nervous system, a study begun some years ago by Dr. McKinnon and Dr. French. Dr. Kerslake has continued his observations of the response of the horse to various doses of tetanus toxoid and the persistence of the antitoxin so induced.

The animal colonies have fully maintained their record of past years, and continue to receive the warm commendation of visitors from other laboratories.

During the year, 10,111 guinea pigs, 6,525 rats, 38,117 mice and 153 ferrets were supplied to the laboratories.

Library

Miss Olga E. Somerville, librarian of the Connaught Laboratories, has reported that the library has been widely used, not only by members of the staff but also by graduate and other students. Consideration is being given to the providing of additional space to accommodate the growing needs of the library. The file of bound periodicals now numbers 2,513. The preparation of a semi-monthly index of current scientific articles as well as the translation service, conducted by Miss K. Pichler, have been greatly appreciated. Volume X of the Studies of the Connaught Laboratories was published, containing 52 papers. This is the largest annual volume of the Studies which has been published.

Western Division

During its fourth year of existence, the Western Division of the Connaught Laboratories consolidated the position it has striven to make for itself in the life of the University of British Columbia, as well as in the affairs of the local medical profession, and of the provincial health services. The objective of its staff has been to symbolise the nation-wide scope of the Connaught Laboratories' activities and interests, by pursuing researches in the field of bacteriology, immunology, and epidemiology in the westernmost province of Canada.

During the first six months of the period, the staff numbered five, as in previous years. Dr. C. E. Dolman continued to direct the work of the Western Division as a research member of the Connaught Laboratories. Dr. K. F. Brandon, who had been appointed research assistant as from June 1, 1938, served also as epidemiologist (part-time) to the Metropolitan Health Committee of Greater Vancouver, and as director of the University Health Service. Dr. Brandon resigned his position in the Western Division in order to take over, as from January 1, 1939, the full-time position of Assistant Senior Medical Officer to the Greater Vancouver Metropolitan Health Committee. Dr. L. E. Ranta, D.P.H., has been appointed to replace Dr. Brandon.

Dr. Dolman has continued his staphylococcus researches, a field of investigation which shows no sign of approaching infertility. Evidence has been obtained that the unpleasant reactions occasionally invoked in some individuals by staphylococcus toxoid are due to a specific soluble bacterial substance, and not to small amounts of undetoxicated exotoxin. The nature of this substance, whether protein or carbohydrate, is being currently investigated. Good progress has been made in efforts to separate the alpha and beta toxic components, and the enterotoxin, from filtrates containing all of these factors; and it is hoped that methods of concentration and purification now on trial may permit the antigenic and pathogenic properties of the separate components to be determined, without the intrusion of the mutually inhibitory or adjuvant effects which may occur when crude filtrates are tested. During the year, apart from the laboratory technicians employed by the Western Division whose assistance in this particular work has been most helpful, a problem relating to the reactions produced in human beings by detoxicated staphylococcus toxins was assigned to an honour-course student in the department of bacteriology and preventive medicine at the University of British Columbia; while fundamental work on the separation, by chemical methods, of certain of the toxic components of staphylococcal filtrates was carried out by Mr. Marvin Darrach, M.A., who worked enthusiastically in a voluntary capacity under Dr. Dolman's direction. Numerous strains of staphylococci, isolated from raw cow's milk, from human faeces, and from foodstuffs suspected of causing food-poisoning, were made available to us for investigation by the Division of Laboratories of the Provincial Board of Health of British

Columbia. Our interest in staphylococcal food-poisoning has been maintained, two or three outbreaks which occurred in Vancouver having been identified in co-operation with the Provincial Laboratories.

Apart from staphylococcus researches, Dr. Dolman has continued work on *Brucella abortus*. Infections with this micro-organism present many features of marked clinical, immunological, and epidemiological interest. In conjunction with Miss Hudson of the Provincial Laboratories' staff, surveys have been made which showed that *Br. abortus* could be isolated from a surprisingly high percentage of pooled raw-milk samples selected at random from dairies distributing within the city. Moreover, it was conclusively demonstrated that the attempted elimination of "reactors" (cattle showing specific brucella agglutinins in their blood serum) from dairy herds will not reduce the incidence of human brucellosis in a community supplied by raw milk from such herds. These findings were presented, in collaboration with Miss V. G. Hudson and Mr. D. G. B. Mathias, at the Christmas 1938 meeting of the Laboratory Section of the Canadian Public Health Association.

Dr. Brandon, during the period of his appointment, engaged in several researches. He collaborated with the staff of the Provincial Laboratories in adapting Dr. Craigie's method of typing Vi strains of *B. typhosus* by means of their phage susceptibility, to the tracing of the routes of spread of infection in various local epidemics. He also collaborated with them in methods of haemolytic streptococcus grouping and typing. Dr. Brandon conducted an investigation of outbreaks of water-borne bacillary dysentery and of milk-borne typhoid fever, at Powell River, British Columbia, and Merritt, British Columbia, respectively.

Earlier studies initiated by Dr. R. J. Gibbons on gonococcus culturing have been carried on in some degree. The results of a two years' survey involving this method have been published.

Distribution of Products

The products which are regularly supplied by the Laboratories now number thirty-two including two of which sale was commenced during 1938-39, viz. anti-pneumococcus serum prepared from the blood of immunised rabbits for use in the treatment of pneumonia and tetanus toxoid which is used in the conferring of a lasting immunity against lockjaw.

All nine of the Canadian provinces provide either limited or general free distribution of products of the Connaught Laboratories, and the greatest bulk of the Laboratories' sales are for the accounts of the provincial departments of health of these nine provinces. It is not only from coast to coast of the Dominion, however, that the products, prices, and services of the Connaught Laboratories are appreciated. During 1938-39, the Laboratories were called upon to export products to several British and foreign countries, e.g. Angola, Australia, Belgium, Bermuda, British West Indies (Leeward Islands, Windward Islands, Barbados, Trinidad, and Jamaica), Chile, China, Cuba, England, France, Holland, Ireland, Japan, Newfoundland, South Africa, and the United States of America. The total volume of distribution of the Laboratories' products during this year has been greater than during any preceding year, affording further evidence of the widespread recognition of the services of the Connaught Laboratories in the preparation and supply of biologicals for the prevention, treatment, or cure of disease. I wish to record with appreciation the services of Mr. F. Lorne Hutchison as comptroller. During the year, Mr. K. E. Allen has been appointed assistant comptroller in addition to his duties as accountant, and Mr. W. P. Gerald has been appointed assistant accountant.

In the exercise of its functions, the Laboratories are able to serve as a useful medium for teaching, and during this past year, demonstrations and exhibitions of the University and Farm Sections were made available as usual to

undergraduate and graduate classes in hygiene, preventive medicine, and related public-health subjects, as well as to various societies, groups, and individual visitors. The latter included guests from numerous parts of Canada, the United States of America, and the British Isles, and from other countries including Argentina, Australia, Belgium, Ceylon, China, Cuba, Hungary, India, Japan, Java, Jugoslavia, New Zealand, Panama, Roumania, South Africa, and Sweden.

In Dr. FitzGerald's absence, I take this opportunity of expressing sincere thanks on his behalf, as well as on behalf of my colleagues and myself, for the advice and support which you and the Chairman and other members of the Connaught Laboratories Committee have so generously given to us.

(23) STATEMENT REGARDING THE MUSEUM OF ARCHAEOLOGY

(*Professor C. T. Currelly*)

Among the accessions of the year 1938-39 were several objects never dreamed of as possible possessions of this province.

Chance put within our reach two statues of the Madonna and Child, one Île de France about 1320, the other Italian work of the 15th century. Added to the four important sculptures obtained during the preceding two years, these go a long way towards filling the very serious gap in the collection of early European sculpture, felt still more severely as the university department of fine art developed.

Another accession was a South Indian bronze figure of Siva, probably late 11th century A.D. The god is represented in his Natarāja manifestation, dancing to maintain the equilibrium of the universe. The figure is 40 inches high and in practically flawless condition.

Another of the most outstanding acquisitions was an inscribed bronze sword from Luristan. It belonged to Marduk-shâpik-zêri, king of Babylon about 1170-1153 B.C. In beauty of design and workmanship, and as the oldest inscribed Babylonian sword known, Dr. T. J. Meek, by whom it has been published, considers it the very finest of the Late Bronze Age swords from Luristan. Mr. and Mrs. T. Frank Matthews generously presented the funds for its purchase.

Through the Reuben Wells Leonard Bequest, another piece of great importance was acquired just at the close of the year: a stone bas-relief of the 9th century B.C., from the palace of Ashur-nasir-pal at Nimroud. With its design of winged spirits attending the sacred date palm, and its beautifully executed cuneiform inscription, this slab gives us an extremly fine and characteristic example of Assyrian sculpture.

Among the purchases and the 101 donations of the year were many other pieces of high quality, though less spectacular. A donor paid for six water-colour sketches reproducing Cretan and Mycenaean frescoes, painted to our order in Crete by a well-known artist. These are valuable illustrative material in a department which must necessarily remain very small, but which contains our fine ivory and gold goddess and a few other rare objects.

To the collection of arms and armour were added two Turkish iron helmets of the 15th and 16th centuries, with incised and inlaid decoration and the mark of the Arsenal at Constantinople. The Armouries of H.M. Tower of London made a gift of thirty-two pieces of English arms and armour from the late 16th to the 19th century; a brass wall gun of 1740 is a particularly interesting piece. Brigadier General W. F. Sweny added several interesting Abyssinian objects to the collection begun by his father, Colonel G. A. Sweny.

We were fortunate in being able to secure three pieces of early furniture, a 16th century French tabouret and two Italian folding slatted chairs of the 15th and 16th centuries. An example of fine cabinetmaking is an Ontario mid-19th century mahogany sewing table presented from the collection of Mrs. Ada B. Tindall.

A few choice pieces were added to the collection of pottery and porcelain: an important 15th century Hispano-Moresque plate from Valencia; a Chelsea double-handled cup and stand of about 1765; a Chelsea-Derby cup and saucer of about 1770, the gift of Mrs. Bryce B. Hunter; a Derby figure of Neptune, about 1768, presented by Mrs. H. M. Peacock. The popularity of the Chinese porcelain plate in the West, continuous from the 17th century onwards, is interestingly illustrated in three 19th century plates identical in design, one made in China for export, one in Russia, and one in England.

The large collection of Irish and English glass presented last year by Mrs. R. Y. Eaton was augmented by fifty pieces, among them three finely decorated hurricane shades.

The textile department received a very large number of additions, mostly by gift. Outstanding among them were a Persian printed cotton; an 18th century man's coat and shirt from Mrs. Wm. A. Howard; a suit worn by the Hon. Robert Baldwin, presented by Mr. Harry Baldwin; a black lace fan, and a pair of men's leather boots worn in Ontario about 1840, presented by Miss A. C. Carpmael; a black lace shawl given by Mrs. Archibald H. Campbell; a lady's silk dress of about 1875, from Professor T. F. McIlwraith; a considerable collection of costumes and accessories of the late 19th and early 20th century, from Mrs. W. F. Sparling; an interesting archery jacket of 1870 and a handsome bonnet, teagown and wrap of 1890, presented by Mrs. L. H. Baldwin; a child's dress and pinafore of 1885, from Mrs. George C. Gale; and seven pieces from members of the Junior League in continuation of their gift of 20th century costume.

A series of Korean type from the Gael Collection increases the interest of our collection of early printing. Miss C. L. Scott presented an illuminated manuscript, and Dr. H. J. Cody gave three manuscript leaves from a Spanish missal and an important early English manuscript volume containing contemporary copies of royal charters. Mr. Paul Hahn continued to sponsor the collection of postage stamps and was the means of a large number of specimens being presented.

A very fine Chinese pottery wine jar of the Ming dynasty was obtained from the Greenshields Collection, and Mr. Chauncey J. Hamlin of Buffalo gave an interesting series of clay moulds for casting the early Chinese bronzes.

As usual, a very large number of accessions was received in the ethnological department, mostly as gifts: mention can be made of only a few. Dr. J. H. McKay gave thirty-five specimens from the Cameroons. Mr. L. A. Learmonth added nearly fifty pieces to his Eskimo collection, and a small collection was obtained from the Padlemiut Eskimo. One of the rare pattern boards for the weaving of a Chilkat blanket was secured, five stone implements from Saskatchewan, fifteen old bark baskets from Quebec, and twelve fine stone artifacts from the Payne Stone Age Collection. An important addition was fifteen strings of wampum used in the Iroquois "Requickening Address".

Mr. John Pound kindly presented a very large quantity of material of Neutral Indian culture found on his farm near Aylmer by the Museum's field party last summer. Dr. Nash's account of the excavations was presented in a Museum lecture in the Directors' Series last autumn, and at a joint meeting of the Central Section of the American Anthropological Association and the Society for American Archaeology at Ann Arbor in May. Professor McIlwraith will join Dr. Nash and his party this summer to complete the work at Aylmer, and a survey will also be made of Indian sites in Algonquin Park.

The routine work of our various workrooms and offices has gone on without interruption, good progress having been made in all departments. Two large paintings on Viking subjects, done by Miss Sylvia Hahn for the Children's Room, have already proved their value as teaching material; "The Vikings" is a subject frequently requested by school classes, and the galleries provide no illustrations other than weapons.

The Rockefeller Foundation's grant of last year has greatly accelerated the

work of the East Asiatic department. The first publication under the grant was made during the year, Museum Studies No. 1, Tomb Tile Pictures of Ancient China, by Dr. W. C. White. Very favourable comment has been made on the book, both for Dr. White's scientific and literary contribution and for the distinguished work of the University Press.

The Museum sustained a great loss last autumn in the death of Sir Robert Mond. His interest in a museum for Toronto preceded by several years the formation of the Royal Ontario Museum, and continued till his death with an unfailing enthusiasm and generosity. The catholicity of his own tastes and the wide range of his knowledge are evidenced by his many important gifts to the Museum: Egyptian, Roman, early Chinese, European ironwork, French furniture and porcelain, firearms, engravings, ethnology, a quarter-share in the Chinese Library. He honoured the Museum by becoming an Honorary Trustee, and accepted an LL.D. degree from the University of Toronto.

(24) STATEMENT REGARDING THE ROYAL ONTARIO MUSEUM OF ZOOLOGY

(Professor J. R. Dymond)

The Museum of Zoology contributes to the diffusion of knowledge about animal life through the following means: gallery exhibits, instruction to groups in the gallery and in the museum theatre, lectures to groups outside the museum, both in Toronto and beyond, occasional radio broadcasts, distribution of scientific and popular publications, loan of lantern slides and specimens, supplying information to the press, contributions to natural history and other journals, assistance to authors of text books and other writers, assistance to naturalists who visit the museum and through correspondence with those at a distance.

The Museum increases existing knowledge about animal life through field expeditions, study of collected, donated, purchased and exchanged material, study of museum specimens by graduate students of the University, loan of specimens to other research institutions, identification of specimens for research workers in other institutions, assistance to naturalists and other students of animal life.

During the year, one of the new style exhibits illustrating the beaver and its importance to Canada was installed. An exhibit showing the life history of salmon and other fish was reinstalled in a new case. Mounted specimens of the Rocky Mountain caribou and the white-tailed deer were placed on exhibition. During the past year, special attention has been given to temporary exhibits. These included reproductions of Audubon's bird paintings, nature photographs by local naturalist photographers, works of Edwards and Catesby (which are among the earliest works on the natural history of North America), natural history notes and publications of Charles Fothergill who came to Canada in 1816, and an exhibit of the results of the summer's field expeditions. The annual exhibition of tropical aquarium fish was again placed on view in our gallery by the Toronto Aquarium Society for two weeks at Easter-time. In our own aquarium many living specimens of native and tropical fish, bullfrogs, toads, mudpuppies, turtles, salamanders, etc. were placed on view during the year. Other living exhibits included the tarantula, trap-door spider and several kinds of non-poisonous native snakes.

The scientific collections continue to grow steadily. The number of specimens of the more important groups added during the year was as follows: mammals 1745, birds 2634, reptiles 81, amphibians 170, fish 1218 lots, spiders 13,289, insects 10,519, molluscs 1301 lots and other invertebrates 256 lots.

Accessions to the library were 77 books and 2871 unbound publications.

Some of the more outstanding donations received during the year were as follows:

Boggs, O. D. International Petroleum Company, Negritos, Peru. Collection of 162 bird skins from Peru and Ecuador.

Cockburn, R. R., 8 Grandview Ave., Toronto. Bearded seal from the Ontario waters of James Bay.

Doan, K. H., 209 Glengrove Ave. W., Toronto. 359 lots of small fish collected in the Toronto region.

Goddard, Wm., Berens River Mine, Patricia District, Ontario. 66 mammals, 54 birds and 19 fish from the Favourable Lake region.

Hahn, Paul. 22 Bloor St. E., Toronto. One passenger pigeon; the fifty-first Mr. Hahn has donated to the Museum.

Herrington, Rev. H. B. Large number of land and freshwater shells from Hastings County.

Kilborn, Dr. L. G., Chengtu, West China. 2 lesser pandas; a collection of land and freshwater shells from Chengtu, Szechan, China. This collection contains our first land and freshwater shells from China.

Lang, K. H., Aklavik, N.W.T. 10 fish from Aklavik.

Learmouth, H. Fort Ross, Somerset Island, N.W.T. 38 bird skins, representing 25 species, from Somerset Island. This is our most northerly collection.

National Parks Bureau, Ottawa. Rocky Mountain caribou.

Rutter, R. J. 357 Baysview Ave., Toronto. 78 small mammals, 187 bird skins, 4 bird nests.

Quite extensive field collecting was carried on by the Museum of Zoology in the summer of 1938. A party consisting of Messrs. Hope, Prince and Neal spent ten weeks in the Favourable Lake region of Patricia District. This expedition was financed out of the Reuben Wells Leonard bequest. The fauna of the northern parts of Ontario is virtually unknown, and this was the first faunal survey made in this vast area. Large collections of material were secured and much information collected.

Messrs. Cross and Downing worked in western Quebec collecting mammals. The collection secured is of especial interest, as it contains a number of topotypes. Data were secured on comparative abundance of animals in adjacent river valleys, seasonal activity of mammals, efficiency of different methods of collecting, etc. Mr. Baillie spent a month studying the bird life of Manitoulin Island. Mr. Oughton spent two months in Temagami collecting molluscs and small invertebrates and studying the factors influencing the distribution of small animals. Messrs. Kurata and Urquhart worked at Point Pelee for two months, collecting spiders and insects respectively.

Mr. Shortt spent three months accompanying the Government Party on the Hudson Bay Steamer 'Nascopie' on the annual Arctic Patrol. The most noteworthy result of this trip was a collection of Arctic birds, but many coloured and pencilled sketches of birds were also obtained, together with other natural history material.

Additional details of the Museum's work are contained in the Museum Bulletin Number 8.

(25) STATEMENT REGARDING THE ROYAL ONTARIO MUSEUM OF GEOLOGY

(*Professor E. S. Moore*)

The Director spent the past summer visiting many mines and other features of geological interest in St. Helena, South Africa and Rhodesia. Collections were obtained in South Africa from the Kimberley diamond mines, several parts of the great Rand gold field and the Bushveld Igneous Complex; also in Southern Rhodesia from the asbestos and chromite deposits, and in Northern Rhodesia

from Broken Hill and the great Copper Belt. A number of donations were also received for the Museum and University collections during the trip.

Donations received during the year:

Two rare specimens of descloizite from Broken Hill, Northern Rhodesia. Dr. J. A. Bancroft, Johannesburg, S.A.
Specimens of native gold ore from East Geduld mine, Rand, S.A. J. A. Becking, Esq.
Kimberlite and other rocks from Kimberley mines. De Beers Consolidated Mines Limited.
Gold ores, and other specimens.
The Department of Geology, The University of the Witwatersrand, Johannesburg, S.A.
Copper ores and rocks from the Nkana Mines, Northern Rhodesia. The Rhokanna Copper Company.
Copper ores from the Roan Antelope Mine, Northern Rhodesia. The Roan Antelope Copper Company.
Copper ores from the Mufalira Mine, Northern Rhodesia. J. E. D. Tallant, Esq.
Large specimens of "Porphyry Copper", from Kimberley, Nevada. John A. Richards, Esq.
A large polished specimen of silver ore from the Contact Mine, Great Bear Lake. C. L. Hershman, Esq.
A number of publications for the Museum library from the library of the late Professor J. P. McMurrich. Miss Kathleen and Mr. J. Ronald McMurrich.
An unusual specimen of amygdoloidal lava. Dr. H. C. Cooke, Ottawa.

Purchases:

Spectacular native gold ore from Victoria, Australia.
Ores of special types from the United States, Chile, Germany and Norway.
Precambrian algae concretions from several localities.

The Museum of Geology provided an exhibit for the Science exhibition at the Toronto Public Library last autumn. Two lectures were given in the Tuesday lecture series at the Museum, and a large number of children from outside Toronto were given instruction in the galleries.

The Director regrets to have to state that the assistant director, Dr. Jack Satterly, has severed his connection with the Museum to accept a position with the Ontario Department of Mines.

(26) STATEMENT REGARDING THE ROYAL ONTARIO MUSEUM OF MINERALOGY

(*Professor A. L. Parsons*)

The collections of this Museum have been augmented during the year by exchange, donation, purchase and collection by the staff.

Probably the most outstanding and spectacular addition to our gallery during the year is the crystal cave. This was made possible by an exchange with the New York State Museum. The original cave was opened up in quarrying operations and furnished about forty tons of calcite crystals of two types. The largest crystal weighed more than half a ton. The largest in our reconstructed cave weighs 476 pounds.

Other important exchanges are as follows:

A fine series of borates and potash salts have been received in exchange from the Tschernyschew Museum in Leningrad and are now on display in the case (W. 9) devoted to recent acquisitions.

An excellent series of minerals from western Canada has been contributed in exchange by the University of Alberta and is now on display in the case (W. 10) devoted to recent acquisitions from Canada.

Remarkable specimens of celestite and fluorite from Clay Centre, Ohio, have been received in exchange from C. S. Bullen, Ypsilanti, Michigan.

A continuing exchange with Harvard University has enriched our collection with three minerals new to science, Leightonite, Bandylite and Hilgardite.

Among the outstanding donations may be mentioned the following:

The Johannesburg Consolidated Investment Company—a series of platinum-palladium minerals from South Africa, three of which are new to this museum.

Professor G. M. Brownell, University of Manitoba—zeolites from the Sherritt Gordon Mine.

M. F. Goudge, Esq., Department of Mines and Resources, Ottawa—pyroaurite, a mineral new to Canada.

Dr. E. S. Simpson, Perth, Australia—additional new minerals from Western Australia.

John Knox, Esq., Hollinger Mine—a remarkably fine "Copper Bowl" from the Calumet and Hecla Mine.

A. F. Brigham, Esq.—a series of the minerals associated with diamond at the Kimberley Mines.

C. L. Hershman, Esq., Toronto—a fine specimen of native silver from Great Bear Lake.

Wm. C. Inch, Esq.—specimens of bismuth from Cobalt, Ontario.

Prof. R. P. D. Graham—Pyroxene, Notre Dame des Ange, Quebec.

Dr. W. L. Brown—Minerals from Arizona, Arkansas and California.

Dr. A. S. Dadson—a series of vesuvianite crystals from Great Slave Lake, N.W.T. which have since been described by the scientific assistant curator Dr. V. Ben Meen.

Victoria Memorial Museum—Lapis Lazuli from Lake Harbour, Baffin Island.

Further additions of fine specimens of gem stones have been made from money provided by the bequest of the late Reuben Wells Leonard, Esq. The gem collection now contains good specimens of most of the gem stones and is one of the popular exhibitions in the gallery.

Collecting activities were confined to a ten day trip by the Director in the Grenville and Thetford Mines regions.

The automatic balopticon with its series of pictures relating to the mineral industry continues to be an attraction to young and old alike. The exhibit of fluorescent minerals is a never-failing attraction where thousands can see the different effect of ordinary light and ultra-violet light in producing colour in certain minerals. An ever increasing number of students are making use of the systematic collections of minerals and rocks and the paragenetic collections, with most gratifying results.

During the past year several special excursions of school children from other centres in Ontario have come to the museum on Saturdays. This involves extra work by members of the staff of the museum to give instruction to groups in the gallery. Arrangements are being made to continue this extremely important phase of the museum's work during the coming year, which may possibly involve the employment of assistants for the work.

The routine work of the Museum has been well carried on by the two paid non-scientific assistants, and the part-time scientific assistant curator, Dr. V. Ben Meen, has completed an investigation of the Vesuvianite from Great Slave Lake Region, Canada, and an interesting meteorite from Santa Luzia de Goyaz, Brazil.

(27) STATEMENT REGARDING THE ROYAL ONTARIO MUSEUM OF PALAEONTOLOGY

(*Madeleine A. Fritz*)

The Museum of Palaeontology celebrated this year, along with the other four component museums comprising the Royal Ontario Museum, its twenty-fifth anniversary. To commemorate this event a history of the growth and development of palaeontology, first in the University and later in the Museum, has been prepared. This historical outline will be published, it is hoped, within the near future.

In last year's report special mention was made of the mural panels by G. A. Reid, R.C.A., typifying successive periods of time in the geological history of the world. During the past year this extensive series of 34 murals, accompanied by adequate descriptions, has been completed and installed in the galleries of invertebrate palaeontology. These paintings, which were planned by the late Professor W. A. Parks, contribute greatly to an understanding of palaeontological history. They were provided for by a grant from the Reuben Wells Leonard Bequest.

A few outstanding exhibits have been placed in the galleries during the past year. Among these may be noted the skeleton of a *Dodo* and the restoration of a Tertiary marine fauna. The latter completes the series of restorations of six geological periods begun in 1935.

Two special exhibits were prepared for the Canadian National Exhibition. They consisted of (1) the story of Amber, the sea-gold of the Baltic and (2) a demonstration of how a dinosaur is prepared.

A travelling exhibit dealing with the mastodon and mammoth was arranged and sent to Kitchener.

During June and July a short but successful expedition was conducted to the fossil fish localities of Gaspé and New Brunswick. Many interesting specimens were added to the Museum collections as a result of this field trip.

The Museum of Palaeontology participated as usual in the Museum's general educational program by giving lectures and demonstrations to (1) the visiting groups of out-of-town children (2) adult groups from Toronto visiting the Museum during "open evenings", and (3) to large groups of Toronto children that assembled in the auditorium on Saturday mornings during the month of March.

In the series of popular lectures under the auspices of the Committee of Directors this Museum contributed three entitled: The History of the Great Plains in Canada, The Rise and Fall of Fossil Dynasties, and the Restoration of Dinosaurs.

The following lists indicate the chief acquisitions to the Museum of Palaeontology during the past year:

By collection

A large collection of Upper Devonian fishes from Maguasha, P.Q.
A small collection of Middle Devonion fishes from Campbellton, N.B.
A fine collection of Lower Carboniferous fishes from Albert Mines, N.B.
A collection of Upper Silurian fishes from St. John, N.B.

By donation

Concretion from varved clay, Sandy Creek region, Ontario—Mr. Morley Neal.
Recent Gastropoda from Ontario—Rev. H. B. Herrington, Thomasburg, Ontario.

Collection of books and pamphlets for the library of Palaeontology—Mr. J. Ronald McMurrich and Miss Kathleen McMurrich, Toronto.
Collection of books and pamphlets for the library of Palaeontology—Dr. W. S. Dyer, Toronto.

By exchange

Collection of Scoleodonts from the Albion sandstone of the Lower Niagaran Gorge from R. R. Hibbard, Buffalo, N.Y. for a set of Ontario Bryozoa.

By purchase

One piece of amber from O. M. Jensen, Lekken, Denmark.
Fine specimen of centipede, *Acanthotelson evansi* M. & W.—Pennsylvanian, Mazon Creek, Illinois.
Collection of Ordovician Graptolites from Australia. Wards Nat. Hist. Estab., Rochester, N.Y.
Collection of Brachiopods of the family *Productidae*. Wards Nat. Hist. Estab., Rochester, N.Y.

(28) STATEMENT REGARDING THE EDUCATIONAL WORK OF THE ROYAL ONTARIO MUSEUM

(*Helen Reynar, Secretary-Treasurer*)

The educational work of the Museum with its varied activities has been carried on with marked success during the past year.

Out-of-town Groups

Steadily increasing requests for tours of the Museum and lectures on its exhibits have come in from schools outside of Toronto, 84 groups (6,175 children in all) having been taken care of by Miss Ruth M. Home, Miss Ella N. Martin, Mr. F. A. Urquhart of the museum of zoology, and other members of the staff. Among the towns and cities taking advantage of this service were Sudbury, Parry Sound, St. Catharines, Welland, Cobourg, Stayner, Woodstock, Elmira, Listowel, Burford, Uxbridge, Palmerston, Stouffville, Niagara Falls, Hamilton, Islington, Collingwood. Five large groups of approximately 400 each came from Fergus, London and Kitchener to spend a "Museum Day" with its programme of special gallery talks, movies and mid-day meal. Members of the Boy Scout Association assisted on these occasions in guiding groups from one lecture to another.

Saturday Morning Lectures and Moving Pictures:

Moving pictures and lectures for children were carried on during the school year on Saturday mornings under the direction of the five museums. Of special interest were the "Grey Owl" pictures, "Elephant Boy", "Nanook of the North", and "The Private Life of the Gannet". A dinosaur puppet show was an interesting and novel experiment. Total attendance for the season was 11,787.

Open Evenings

Five "Open Evenings" were held during the season with an attendance of 913. These evenings are arranged for groups who are unable to attend lectures in the museum during the day; one floor of the building being on exhibition each night. Among the groups were the following: University College Alumnae, Robert Simpson Co. staff, Islington Young People's Club, York County Home and School Clubs, Boy Scouts Association, Young Men's Canadian Club, Library

School, St. Clair Y.M.C.A., Zonta Club, Dr. Horwood's Music Appreciation class. On account of the overhead expense involved, it has been decided to discontinue this service during the coming season except for groups that will guarantee a fee of $25.00 per evening.

Pay Courses

Miss Ruth M. Home continued her pay courses in "The Modern Home" arranged with the cooperation of the Ontario Association of Architects and the Society of Interior Decorators, with 36 enrolled, and in "Ceramics" with a registration of 45. Two new courses for teachers—"The Development of the Canadian Home" and "Social Studies"—attracted 110 students. These courses were conducted by members of the museum staff.

The Collectors' Exhibition of pottery and porcelain held in connection with the "Ceramics" course, and comprising some 352 specimens, was a new venture.

Travelling Exhibits

Loan exhibits have been sent to the Public Libraries of Kitchener and Stratford during the year, in rotation, by the museums of archaeology, palaeontology and zoology. An interesting collection of Ontario Indian material is at present in Kitchener.

Classes for School Children

During the school year Miss Lilian J. Payne, teacher at the museum under the Board of Education, lectured to 670 classes, totalling 25,421 children. Of the 42 subjects offered by Miss Payne, these chosen most frequently were the lectures on Indian Life, Egypt, Roman Britain, Natural History Tour, Dinosaurs, The Chinese Galleries, and Sixteenth Century England. Miss Payne teaches only Grades VI and VII. All other public, private, and high school classes are taken care of by Miss Home and her assistants, who gave instruction to 65 classes from public schools, numbering 2698 pupils; to 48 classes from private schools, with 2727 pupils; and to 25 classes from high schools, with 1265 pupils.

Tuesday afternoon Public Lectures

For the sixth consecutive season the committee of directors continued its five-o'clock lectures on Tuesday afternoons during the fall and winter season. One course of seven lectures was given by members of the museum of archaeology staff before Christmas; which was followed by eleven lectures by members of the four natural history museums staffs. Approximately 4883 persons attended these lectures.

Children's Room

To provide a place for informal talks on museum exhibits, for models and other material which can be handled by children, and to increase the interest of children in museum collections by means of sketching, modelling, questionnaires, games, etc., a room has been fitted up in the basement where small groups can be conveniently cared for. This work is still in an experimental stage.

In addition to the above-mentioned activities, ever-increasing use is being made of the museum by art students, university undergraduates, and students in the School of Graduate Studies. Summer School classes for teachers are conducted each season under the direction of Professor J. A. Alford assisted by Miss Home.

The Hart House String Quartet very generously gave four concerts for children on Saturday afternoons in the museum theatre.

Total attendance for the year ending 30th June, 1939, was 255,134.

(29) REPORT OF THE DIRECTOR OF THE DAVID DUNLAP OBSERVATORY

(Professor R. K. Young)

The end of the present fiscal year June 1939 completes the fourth year of operation of the David Dunlap Observatory. The first major programme of the determination of the radial velocities of all stars in the Kapteyn areas has been completed.

Observing conditions have been fairly constant from year to year and the four year average gives a reasonable index of what may be expected in the future. The number of working hours with the telescope and the number of plates obtained are shown below.

	Plates Obtained	No. of Hours
1935-36	989	1096
1936-37	1086	1197
1937-38	1216	1323
1938-39	1290	1417

During the year several important pieces of apparatus were constructed in the workshops. The one-prism spectrograph was fitted with an automatic sensitive temperature control. A new rotating shutter camera fitted with a battery of six cameras was constructed for the efficient observation of meteors and meteoric spectra. A portion of the carpenter shop was subdivided and equipped with a lens grinding apparatus with which the optical parts of a "Schmidt" camera have been completed. The mounting for this is well under way and when completed it will be used in conjunction with the present spectrograph for the observation of very faint stars. A start was also made on the construction of a high dispersion spectrograph employing a new grating ruled on aluminum coated glass.

Accessions to the library during the year number 399: gifts, 29; purchase, 42, exchange 10, from the Royal Astronomical Society of Canada, 55; from the Dominion Meteorological Service, 263. At present there are 3695 volumes in the library; of these 1757 are on loan from the Royal Astronomical Society of Canada and 263 on loan from the Dominion Meteorological Service. In addition there is a large amount of unbound material which is not included in the figures given above.

During the year a very satisfactory start has been made toward the creation of the arboretum. The work is being carried on by the staff of Col. LePan, superintendent of buildings and grounds of the University, under the direct supervision of Mr. Shortreed. Nearly two hundred fair-sized trees have been transplanted to the Observatory, and are set out on the hill-top around the buildings. A more extensive development consists of a nursery at the east end of the property, where many thousand seedlings are set out, to be transplanted during the coming years to the rest of the grounds.

(30) REPORT OF THE OFFICER COMMANDING THE U.O.T. C.O.T.C.

(Lt.-Col. H. H. Madill, V.D., m.s.c.)

I have the honour to report on the activities of the University of Toronto Contingent of the Canadian Officers Training Corps for the academic year 1938-1939, as follows:

As was to be expected, following the international tension of last September, the opening of the academic term saw an increasing interest among undergraduates in corps activities. This was revealed by the numerous inquiries received for information on courses of study leading to officer qualifications. The enrolment was distributed as follows:

Headquarters	7
"A" Coy (University College)	54
"B" Coy (Medicine & Dentistry)	66
"C" Coy (App. Science & Forestry)	101
"D" Coy (Arts other than U.C.)	70
Attached from other units for instruction	23
Attached from other units for duty	6
	327

The examinations for Certificate "A" (lieutenant) and "B" (captain) may be taken after the second year of service in the corps. These examinations consist of Part I, practical, and Part II, written. The results of the March 1939 examinations are not yet available but for the year 1938 the following certificates were received at the November and March examinations:

"A", Artillery	5	"A", Infantry	20
"B", Artillery	6	"B", Infantry	11
"A", Arty Survey	1	"B", Machine Gun	1
"A", Engineers	4	"A", Medical	5
"A", Signals	3	"B", Medical	2
"B", Signals	2		

Other qualifications obtained were,—

Signals—Visual Telegraphy	6	Lt. Col. qualification	1
Wireless "	1		

It is interesting to note that up to the end of 1938, 1,000 certificates of qualifications in all arms have been received by members of this contingent.

The officers met at Hart House for a Mess Dinner on October 28, 1938. There were forty-one officers and guests present. Later in the evening an illustrated account of the Permanent Force "war games" at Camp Borden last August was given by the O.C. and Major Watson.

A Guard of Honour and the band, under command of Major W. S. Wilson was furnished for the Remembrance Service at the Memorial Tower on November 11th. Under the leadership of our Honorary Colonel, President Cody, the large gathering of staff, students and friends felt deeply the significance of the occasion.

The first church parade of recent years was held on Sunday 13th of November to St. Paul's Anglican Church accompanied by the City of Toronto 110th Sqn. R.C.A.F. and were privileged to share in the services as conducted by Bishop Renison assisted by Colonel Cody.

The annual ball of the Contingent, held in Hart House on January 13th, 1939, was an outstanding success and attended by over four hundred members and guests.

The annual inspection of the Contingent was held on March 16th at the University Avenue Armouries by Brigadier R. O. Alexander, D.S.O., the G.O.C., M.D. 2. Following the battalion ceremonial the work in the various arms of the service was inspected and carried out by companies. The shooting prizes were present by the inspecting officer. A large number of guests of the Corps were present throughout the evening.

As a rule the annual inspection concludes the training season. This year the climax occurred on May 22nd when King George VI and Queen Elizabeth visited Toronto. Every member of the Contingent who could make it possible to be present at that time of year was on parade. The numbers were eighteen officers and one hundred and fifteen other ranks. The Contingent was detailed to a position at the south west entrance to Hart House. The Queen walked through the ranks on her way from the Parliament Buildings to the North Campus where she presented colours to the Toronto Scottish Regiment and again when she returned to the entrance to Hart House. The King later walking from the Parliament Buildings joined the Queen and entered Hart House for the luncheon which was tendered Their Majesties by the Lieutenant Governor and the Executive Council of the Province of Ontario.

A search for suitable accommodation for the numerous activities of the Contingent conducted over a period of years, has finally been successful and 119 St. George Street has been allotted by the University for the requirements of the C.O.T.C. and the Department of Military Studies. A drill hall will be added and will be available for use next fall. Every member of the corps is looking forward with enthusiasm to the increased scope and efficiency of the work that will be possible in the new quarters.

(31) REPORT OF THE SECRETARY-TREASURER OF THE STUDENTS' ADMINISTRATIVE COUNCIL

(*E. A. Macdonald, B.A.*)

The Students' Administrative Council is composed of the presidents or the elected heads of every official undergraduate body, both men and women, of all the colleges and faculties which go to make up the University of Toronto. It is therefore a thoroughly representative university organisation, and is a powerful unifying force in the university. There are as well two members of the staff appointed by the President as his representatives on the Council, Professor S. N. F. Chant and Professor J. R. Cockburn. There is also the president, who must be a graduate of not more than five years' standing, the general secretary-treasurer, and the associate secretary.

The work of the Council is carried on by six important sub-committees, the Publications Committee, the Finance Committee, the Debates Committee, the Sporting Activities Committee, the Loan Committee, and to these there was added this year the Committee on Student Service. All committees have performed their work during the past academic year in a most commendable manner, and much constructive action for the benefit of the whole student body of the university has been the result.

The publications of the Council again this year included the *Students' Handbook*, which was given free of charge to every undergraduate on registration in the fall. In the book this year was much valuable information about the university, together with the names and telephone numbers of every officer of every undergraduate society and organisation of every faculty and college in the university. A very welcome addition to the book this year was a modern, up-to-date map of the city of Toronto. The advertising which the book contained covered the cost of this publication and allowed a small profit on the book.

One hundred issues of *The Varsity* were published throughout the term five days a week. Approximately six thousand copies were printed each day. A staff of more than one hundred and twenty-five students was responsible for the news and feature writing and the technical work of producing the paper, which is supervised by the Publications Committee. *The Varsity*, a large newspaper in miniature, is printed each night in the University of Toronto Press. The paper is organised as is any large paper. At the head there is a student editor-in-chief; a women's editor, a sports' editor, women's sports' editor, news editor, women's news editor, managing editor, feature editor, exchange editor and night editors. All are paid salaries by the Students' Administrative Council. There is also the great army of reporters that form the backbone of every newspaper. These are drawn from every college and faculty in the university, both men and women students. *The Varsity* has been of inestimable value in the past few years in the University of Toronto. It is a great unifying factor, and a great instrument for good. The staff have realised that they are custodians in no small measure of the good name of the university, and this responsibility during the past year was discharged in a most satisfactory manner. Under the editor of the past year, Mr. A. C. Forrest, registered in second year, Emmanuel College, *The Varsity* has had a most successful year.

Fourteen hundred and fifty copies of *Torontonensis* were published during the past academic year. The editor was Mr. John Henry, registered in fourth year, St. Michael's College. We were privileged this year to dedicate the 1939 edition to President Cody on the occasion of the fiftieth anniversary of his graduation. *Torontonensis* provides one of the most important and valuable records of undergraduate activities in the entire university. It contains the photograph and biography of every member of the graduating year, a record of every athletic team and of every undergraduate organisation and fraternity, together with exceptionally fine views of the university. *Torontonensis* is also a great unifying influence in the university, as students from every college and faculty make up the staff of the year book.

Financial aid was again given by the Council to the University Drama Committee, and a group of South African students was entertained by the Council during the Christmas vacation. The Council was host again this year at the garden parties given on June 8th and 9th following the conferring of degrees at Convocation Hall. The President of the University and Mrs. Cody, the president of the Students' Administrative Council, the vice-presidents of the Council, the president of the Engineering Society, the president of the Medical Society, and the president of the Dental Parliament received the guests at the Thursday garden party. At the Friday garden party, President and Mrs. Cody and the president and vice-presidents of the Students' Administrative Council received the guests. A very interesting feature at the garden parties this year was the presentation by President Cody for the first time of the newly-created Honour Award of the Students' Administrative Council. Thirty-eight students in the graduating year, selected by a committee of the Council, received these awards on the day of their graduation. The award was given for outstanding contribution to the undergraduate life of the university. Through the co-operation of the Council, the Graduation Ball was again held in Hart House on Friday, June 9th. The beauty of the whole occasion will remain long in the minds of those who attended this function. This was again by far the largest social event of the year. More than twenty-seven hundred guests attended the ball. The arranging for this function was carried out in the Council offices.

The Council held membership in the National Federation of Canadian University Students, and is by far the largest financial contributor to this organisation. The headquarters of this organisation were this year moved to the Council's offices.

The Debates Committee arranged a debate in Hart House with a representative from Sydney University, Australia, and one from the University of Melbourne, Australia, as guests. A contribution to their expenses was made by the Students' Administrative Council, and they were entertained by the Council while they were visiting the University of Toronto.

The committee on Sporting Activities looked after the organisation and administration of the University of Toronto Band. New uniforms were provided for the band a year ago, at a cost of $1500.00. The band has a membership of sixty students, and is composed of students from every faculty and college in the university. The Council sent the band to the out-of-town games of the football team in Montreal, Kingston and London, and arranged for special excursions for students to these games. The band played at all home games. The cheerleaders, and skits at half-time at the rugby games, are directly under the Sporting Activities Committee. The Council again provided student marshals to look after the student admission to the football games at the stadium, the hockey games, and the admission to the skating rink provided by the new athletic fee. These same student marshals looked after the crowds of students and staff entering the university enclosure on the occasion of the Royal Visit on May 22nd. The distribution of tickets admitting students to this enclosure was looked after from the Council offices.

The University of Toronto Symphony Orchestra, one of the important

activities of the Students' Administrative Council, had a particularly successful year under the able leadership of Mr. Brock McElheran, in third year, University College. The orchestra was invited to give a concert at the Ontario Agricultural College in Guelph, where they were sent by the Council in January. The orchestra was entertained at dinner at the college and at a reception following the concert. The Memorial Hall at the Ontario Agricultural College was filled by members of the staff and students, and the orchestra gave a fine performance. The following week they gave a concert in Convocation Hall for the student body, which was very well attended. Members of the orchestra, like those of the university band, are selected from every constituent part of the university.

To encourage participation of students in winter sports, particularly skiing, the Students' Administrative Council organised two ski week-ends at Limberlost Lodge, Muskoka. Arrangements were made to provide transportation and excellent accommodation at Limberlost Lodge for two days, including meals, at the cost of $7.75. Several hundred students took advantage of these special week-ends. In order to provide an opportunity for students to see the New York World's Fair at low cost, the Council organised a trip to New York for the purpose of visiting the Fair at the conclusion of the examinations. The trip lasted for ten days, and the total cost, including transportation and accommodation, was $31.00.

This year a radio programme was instituted each Wednesday night over Station CKCL for fifteen minutes. The programme was based on happenings about the university taken from the columns of *The Varsity*, and the script was edited in the Council offices before going on the air. The programme was well received, and on two broadcasts the activities of the Students' Administrative Council were outlined. Letters of appreciation came from a number of far distant places.

Again this year the Council was privileged to meet with the President and members of the Board of Governors in Simcoe Hall on the morning of November 11th, and proceed with them to the Service of Remembrance held at the Memorial Tower. Every member of the Council attended the service.

The greatest advance in the Council's activities, and one which was its chief concern this year, was giving practical assistance to less fortunate fellow-students. This help was furnished by its own initiative and its own resources. The help was extended through the Council's loan fund, its housing service and its employment bureau.

The Loan Committee of the Council is composed of a member of the Board of Governors of the university, Mr. J. J. Gibson, and the permanent officers of the Council. Mr. Gibson is chairman of the committee. A total appropriation of $11,500 has been made from the surplus funds of the Council for the purpose of making loans. This has been of the greatest help to a large number of students, making it possible for them to complete their university courses and graduate. That this assistance has been greatly appreciated is shown by the fact that students have made these loans a first charge on their earnings after they have been established, and repayments have been so satisfactory that to date it has been possible for the Council to loan almost $25,000. In the month of January, 1939, approximately $6,000 was distributed in loans to students. The Council wishes to record the great debt it owes to Mr. Gibson, and to express to him its most sincere thanks for his help in the administration of this fund. His judgment and his wide experience are responsible, more than any other single factor, for the successful operation of this fund.

The Housing Service is continuing to be of the greatest benefit to a large number of students living outside the city. Rooms in boarding houses adjacent to the university are given a most rigid inspection during the summer months, and the information is recorded on a card index in the Council office. Approximately twelve hundred rooms in eight hundred homes were inspected last year. Parents of the first year students particularly rely to a great extent on the

Students' Administrative Council to get proper accommodation for their sons and daughters, and as the Council is responsible to the owners of the houses for the students whom they send to them, it is possible to get a much lower rate than the individual student could obtain. One result of this activity has been that each year a number of homes are obtained which will provide free room and board in exchange for services about the house. This has been a great help to students who are in difficult financial circumstances. This was made possible for sixty-eight students attending the university during the past year.

The Students' Administrative Council Employment Bureau has had the most successful year in its history. The bureau has now become known amongst employers, owing to the fact that persons sent to fill the various positions available were selected with great care and proved satisfactory. The bureau has become one of the most important activities of the Council, and more students each year are relying to a great extent on this service to finance their university courses. The bureau is concerned with providing summer, Christmas and part-time work, and again this year as in the past year a number of permanent positions covering a wide field have been obtained for students when they graduated. During the past academic year slightly more than sixteen hundred students were referred to positions.

The great number of students using the facilities which the Council has provided to help them finance their course has taxed to the limit the increased office space so kindly provided this year by the Board of Governors, and has placed a particularly heavy burden on the staff. As a result of the great need, especially in the field of student help, at the suggestion of the President of the University and the Students' Administrative Council, Professor S. N. F. Chant, the President's representative on the Council, and Mr. E. A. Macdonald visited Yale University, the University of Pennsylvania and Pittsburgh University, all of which have particularly highly specialised departments for this type of work. The trip was made with a view to organising more effectively the services which have been initiated by the Council for this work. The report of this trip, together with the recommendations of Professor Chant, was presented to the new Committee on Student Service and to the Students' Administrative Council, and approved. The report was also presented to the President of the University and to the Board of Governors, and approved.

The employment bureau, the loan fund and the housing service have made it possible for a large number of students to continue their university courses, graduate, and become established in a profession or in business, where otherwise this would not have been possible. So much have these services been appreciated by students that entirely unsolicited sums of money amounting to approximately $1,500 have been given to the secretary-treasurer of the Students' Administrative Council this year and the year previous, without condition, to help worthy students who require assistance. The Council wishes to record its most grateful thanks to the donors of this money. Already certain students who have been helped by this fund have repaid the money advanced to them in full, although there was no obligation to do so, and have sent in with their repayment extra donations.

At the opening of the term in October the members of the Council were the guests of President and Mrs. Cody at dinner. This function, which the President gives annually, is one of the happiest occasions of the year, and is anticipated with the greatest of pleasure.

A second-hand Book Exchange is operated for the women students. Many hundreds of books are brought in and resold each year.

APPENDIX B

REPORT OF THE REGISTRAR

(A. B. Fennell, Esq., M.A.)

I beg to submit the following statistics for the year ending June 30th, 1939:—

(*a*) Distribution of the staff of the University and University College (furnished by the Bursar).

(*b*) Distribution of the staffs of the federated Arts Colleges (furnished by the Registrars of the colleges).

(*c*) Registration of students by faculties and years.

(*d*) Enrolment in the Arts Colleges (furnished by the Registrars of the colleges).

(*e*) Enrolment in the university departments in Arts (furnished by the departments).

(*f*) Registration in courses in the Faculty of Arts.

(*g*) Registration in courses in the School of Graduate Studies (furnished by the Secretary of the School).

(*h*) Results of annual examinations (furnished by the Secretaries of the faculties).

(*i*) Admission to degrees.

(*j*) Admission to diplomas and certificates.

(*k*) Geographical distribution of students (furnished by the Secretaries of the faculties).

(*a*) Distribution of the Staff of the University and University College:

	Professors	Associate Professors	Assistant Professors	Associates	Lecturers	Directors	Assistant Directors	Instructors	Other Sessional Appointments
University (Faculty of Arts).....	46	36	36	—	38	—	—	—	138
University College.....	17*a*	6	10	—	8	—	—	—	1
Faculty of Medicine.....	26*b*	12	34*c*	32	18*c*	—	—	—	208
Faculty of Applied Science and Engineering.....	16	13	10	—	23*d*	—	—	—	51
Faculty of Household Science....	2	—	2	—	7	—	—	—	6
Ontario College of Education....	7	5	4	—	14*a*	—	—	28	—
Faculty of Forestry.....	2	2	1	—	2	—	—	—	—
Faculty of Music.....	2	—	—	—	—	—	—	—	—
Faculty of Dentistry.....	10	10	2	21	3	—	—	—	7
Social Science.....	1	—	1	—	18*b*	—	—	—	—
School of Nursing.....	—	—	—	—	24*e*	1	1	1	—

a 1 also in University
b 1 also in Arts
c 1 also in Dentistry
d 1 also in Ontario College of Education
e 2 also in Arts; 12 also in Medicine; 1 also in Dentistry; 1 also in Ontario College of Education

(*b*) Distribution of the Staffs of the Federated Arts Colleges:

	Victoria College	Trinity College	St. Michael's College
Professors.....	11	12	15
Associate professors.....	4	4	8
Assistant professors.....	6	..	2
Lecturers.....	14	7	17
Instructors.....	1	..	8
Fellows.....	1	1	..
Readers.....	4	2	..

(c) Registration of Students by Faculties and Years:

The number of students registered in the university, in colleges and faculties, in the session 1938-39 was 7,322, distributed as follows:

				Men	Women	Total
Faculty of Arts				2,160	1,643	3,803
University of Toronto	695	405	1,100			
University College	582	546	1,128			
Victoria College	427	432	859			
Trinity College	226	161	387			
St. Michael's College	230	103	333			
Registered twice	...	4	4			
Faculty of Medicine				774	61	835
Faculty of Applied Science and Engineering				918	6	924
Faculty of Household Science				...	44	44
Ontario College of Education				502	342	844
Faculty of Forestry				33	...	33
Faculty of Music				28	27	55
School of Graduate Studies				430	135	565
Faculty of Dentistry				231	20	251
Registered twice				26	6	32
				5,050	2,272	7,322

In departments there were registered 662, distributed as follows:

	Men	Women	Total
Department of Social Science	16	72	88
School of Nursing	...	439	439
Physical Education for Women	...	24	24
University Extension (Occupational Therapy)	...	47	47
University Extension (Physiotherapy)	...	44	44
University Extension (Aerial Navigation)	20	...	20
	36	626	662

The grand total of registration for the whole university was 7,960, of whom 5,086 were men and 2,874 were women.

In addition there were 5,927 persons registered in the Department of University Extension in courses and at provincial centres which are referred to in detail in Appendix A (14).

The figures may be further analysed as follows:

Faculty of Arts

University of Toronto

	Men	Women	Total
Teachers' Classes and Summer Session	388	369	757
Occasional Arts students	307	36	343
	695	405	1,100

University College

	Men	Women	Total
First year undergraduates	147	184	331
Second year undergraduates	181	165	346
Third year undergraduates	142	132	274
Fourth year undergraduates	102	51	153
Occasional students	10	12	22
Exchange students	...	2	2
	582	546	1,128

Victoria College

	Men	Women	Total
First year undergraduates	135	138	273
Second year undergraduates	123	115	238
Third year undergraduates	104	108	212
Fourth year undergraduates	62	66	128
Occasional students	3	3	6
Exchange Students	...	2	2
	427	432	859

Trinity College

	Men	Women	Total
First year undergraduates	65	66	131
Second year undergraduates	51	50	101
Third year undergraduates	67	31	98
Fourth year undergraduates	42	14	56
Occasional students	1	..	1
	226	161	387

St. Michael's College

	Men	Women	Total
First year undergraduates	83	20	103
Second year undergraduates	82	40	122
Third year undergraduates	41	31	72
Fourth year undergraduates	22	11	33
Occasional students	2	1	3
	230	103	333

Faculty of Medicine

	Men	Women	Total
First year undergraduates	133	10	143
Second year undergraduates	110	8	118
Third year undergraduates	117	12	129
Fourth year undergraduates	128	9	137
Fifth year undergraduates	123	10	133
Sixth year undergraduates	127	11	138
Candidates for Degree of B.Sc. (Med.)	4	..	4
Candidates for Diploma in Psychiatry	7	1	8
Candidates for Diploma in Public Health	18	..	18
Candidate for Diploma in Radiology	3	..	3
Graduate students	2	..	2
Occasional students	2	...	2
	774	61	835

Faculty of Applied Science and Engineering

	Men	Women	Total
First year undergraduates	314	5	319
Second year undergraduates	224	..	224
Third year undergraduates	211	1	212
Fourth year undergraduates	163	..	163
Fifth year undergraduates	6	..	6
	918	6	924

Faculty of Household Science

	Men	Women	Total
First year undergraduates	..	12	12
Second year undergraduates	..	4	4
Third year undergraduates	..	21	21
Fourth year undergraduates	..	3	3
Occasional students	..	4	4
	..	44	44

Ontario College of Education

	Men	Women	Total
Teachers' Course:			
Students in attendance	162	191	353
Extra-mural students	106	68	174
Librarians' Course:			
Students in attendance	2	42	44
Extra-mural students	..	9	9
Students in B.Paed. course	237	35	272
Registered twice	5	3	8
	502	342	844

Faculty of Forestry

	Men	Women	Total
First year undergraduates	14	...	14
Second year undergraduates	4	...	4
Third year undergraduates	9	...	9
Fourth year undergraduates	6	...	6
	33	...	33

Faculty of Music

	Men	Women	Total
First year undergraduates	3	7	10
Second year undergraduates	9	10	19
Third year undergraduates	16	10	26
	28	27	55

School of Graduate Studies

	Men	Women	Total
Candidates for Degree of Ph.D	116	18	134
Candidates for Degree of M.A	115	62	177
Candidates for Degree of M.Com	1	...	1
Candidates for Degree of M.S	2	1	3
Candidates for Degree of M.A.Sc	24	...	24
Candidates for Degree of E.E	1	...	1
Candidates for Degree of Mech.E	2	...	2
Candidates for Degree of D.Paed	53	2	55
Candidates for Degree of M.Sc.F	1	...	1
Candidates for Degree of M.Sc. (Dent.)	4	...	4
Candidates for Degree of M.S.A	12	...	12
Candidates for Degree of Mus.Doc	4	...	4
Graduate students	94	51	145
Auditors	1	1	2
	430	135	565

Faculty of Dentistry

	Men	Women	Total
First year undergraduates	48	3	51
Second year undergraduates	46	...	46
Third year undergraduates	47	1	48
Fourth year undergraduates	37	...	37
Fifth year undergraduates	48	1	49
Candidates for Degree of B.Sc. (Dent.)	3	...	3
Candidates for Diploma in Dental Nursing	...	15	15
Occasional students	2	...	2
	231	20	251

Department of University Extension

	Men	Women	Total	Grand Total
B.A. Course				
Summer Session:				
Regular students	144	117	261	...
Occasional students	8	9	17	278
Teachers' Classes:				
Toronto:				
Regular students	278	254	532	...
Occasional students	13	6	19	...
Brampton:				
Regular students	13	14	27	578
Specialists' Courses				
Summer Session:				
Regular students	8	2	10	10
Registered twice	76	33	109	109
	388	369	757	757

Department of Social Science

	Men	Women	Total
First year full-time students	9	36	45
Second year full-time students	4	15	19
Part-time students	3	21	24
	16	72	88

School of Nursing

	Men	Women	Total
Full-time students	...	115	115
Part-time students	...	324	324
	...	439	439

(*d*) Enrolment in the Arts Colleges

(1) University College:

	English	Ethics	French	German	German (Sc.)	Greek	Greek and Roman History	Latin	Oriental History	Oriental Languages	Oriental Literature
First Year—											
Pass	164	15	208	40	58	5	4	7	4	20	88
Honour	44	..	37	18	..	1	21	6	..	..	..
Second Year—											
Pass	135	28	142	16	40	3	11	6	9	12	117
Honour	37	16	36	19	..	3	3	12	3	3	..
Third Year—											
Pass	142	74	79	21	..	6	41	4	15	3	86
General	8	..	2	1	..	..	1	1	2	..	..
Honour	11	9	18	10	..	4	4	10	2	2	..
Fourth Year—											
Pass	..	..	..	..	..	6	11	..	..	..	71
General	2	2	2	..	..	..	..	1	..	..	..
Honour	16	12	18	8	..	9	5	9	2	2	..
Totals—											
Pass	441	117	429	77	98	20	47	17	28	35	362
General	10	2	4	1	..	..	1	2	2	..	..
Honour	108	37	109	55	..	17	33	37	7	7	..
Teachers' Classes	132	..	25	..	..	..	..	2	..	..	..
Graduate Studies	56	..	11	4	..	10	..	9	..	4	..
Other Faculties	..	9	167	248	..	..	..	..	..	..	..
Grand Total	747	165	745	365	98	47	81	67	37	46	362

(2) Victoria College:

	English	Ethics	French	German	German (Sc.)	Greek	Greek and Roman History	Latin	Oriental History	Oriental Languages	Religious Know.
First Year—											
Pass	128	16	159	14	33	6	31	7	1	4	94
Honour	42	..	37	13	..	4	16	13	2	..	..
Second Year—											
Pass	105	21	80	10	21	4	15	11	6	1	110
Honour	25	9	29	15	..	5	8	12	2	2	..
Third Year—											
Pass	65	63	42	6	..	3	42	4	2	3	67
General	8	1	..	4	..	..	5	..	..	..	..
Honour	22	9	28	19	..	3	2	6	2	2	..
Fourth Year—											
Pass	..	12	..	..	..	..	30	..	..	..	45
General	11	3	9	4	..	..	2	..	..	..	..
Honour	29	10	21	13	..	1	4	5	..	..	..
Totals—											
Pass	298	112	281	30	54	13	118	22	9	8	316
General	19	4	9	8	..	..	7	..	..	..	..
Honour	118	28	115	60	..	13	30	36	6	4	..
Teachers' Classes	95	..	4	..	..	..	..	..	..	..	..
Graduate Studies	13	2	5	1	..	..	3	3	..	..	..
Grand Total	543	146	414	99	54	26	158	61	15	12	316

(3) Trinity College:

	English	Ethics	French	German	German (Sc.)	Greek	Greek and Roman History	Latin	Oriental History	Oriental Languages	Religious Know.
First Year—											
Pass	53	9	68	9	11	2	6	5	..	..	112
Honour	26	16	22	4	..	..	4	5	1	..	..
Second Year—											
Pass	46	13	41	12	9	1	1	..	..	..	86
Honour	7	4	8	3	..	1	2	2	..	..	..
Third Year—											
Pass	40	15	23	8	..	..	1	2	..	..	91
Honour	7	4	3	2	..	3	3	3	..	..	..
Fourth Year—											
Pass	..	..	..	..	..	1	..	..	..	..	44
General	.	..	..	..	..	1	1	1	..	..	..
Honour	5	6	9	8	..	..	1	1	..	..	..
Totals—											
Pass	139	37	132	29	20	4	8	7	..	..	333
General	..	..	..	..	..	1	1	1	..	..	..
Honour	45	30	42	17	..	4	10	11	1	..	..
Grand Total	184	67	174	46	20	9	19	19	1	..	333

(4) St. Michael's College:

	English	Ethics	French	German	German (Sc.)	Greek	Greek and Roman History	Latin	Philosophy	Religious Know.
First Year—										
Pass	43	36	47	8	8	5	6	26	59	63
Honour	7	..	11	2	..	1	..	6	9	..
Second Year—										
Pass	64	37	40	7	..	3	6	24	62	87
Honour	8	8	9	2	..	1	..	6	9	..
Third Year—										
Pass	39	19	27	5	..	2	1	20	39	56
Honour	2	3	8	1	..	..	..	5	2	..
Fourth Year—										
Pass	..	..	..	..	..	..	..	..	3	26
Honour	9	6	6	2	..	..	..	3	12	..
Totals—										
Pass	146	92	114	20	8	10	13	70	163	232
Honour	26	17	34	7	..	2	..	20	32	..
Grand Total	172	109	148	27	8	12	13	90	195	232

(e) Enrolment in the University Departments in Arts:

The following tables exhibit the numbers attending lectures in the university departments in the Faculty of Arts, together with the number of those taking the practical work in the laboratories:

Department of Anthropology

	Pass	Pass and Honour	Honour
Faculty of Arts—			
First Year	80	77	24
Second Year	..	15	15
Third Year	..	..	18
Fourth Year	..	24	8
School of Graduate Studies	..	14	..
Department of Social Science—			
First Year	..	15	..
Totals	80	145	65

Department of Applied Mathematics

	Pass	Pass and Honour	Honour
Faculty of Arts—			
First Year	4	..	..
Second Year	3	..	45
Third Year	4	..	21
Fourth Year	..	1	13
Occasional Students	..	..	4
Faculty of Applied Science and Engineering—			
Second Year	..	29	..
Third Year	..	10	..
Fourth Year	..	6	..
School of Graduate Studies	..	..	11
Totals	11	46	94

Department of Archaeology

	Pass	Honour
Faculty of Arts—		
First Year	..	7
Second Year	19	17
Third Year	..	18
Fourth Year	..	7
School of Graduate Studies	..	8
Totals	19	57

Department of Astronomy

	Pass	Pass and Honour	Honour	Laboratory
Faculty of Arts—				
First Year	3	..	..	3
Second Year	6	19	..	6
Third Year	7	1	20	19
Fourth Year	..	..	2	..
Faculty of Applied Science and Engineering—				
Second Year	24	..	..	..
School of Graduate Studies	..	..	1	..
Department of University Extension—				
Aerial Navigation	20	..	..	..
Totals	60	20	23	28

Department of Biology

	Lecture Courses			Laboratory Courses	
	1 or 2 or 3 hours		4 or 5 or 6 hours		
	Pass	Honour	Honour	Pass	Honour
Faculty of Arts—					
First Year	90	123	..	90	123
Second Year	97	89	..	97	89
Third Year	60	42	5	54	20
Fourth Year	..	10	2	..	12
Teachers' Classes	55	..	..	55	..
Occasional Students	2	..	..	2	..
Faculty of Medicine—					
First Year	..	143	..	..	143
Faculty of Household Science—					
First Year	..	11	..	..	11
Faculty of Forestry—					
First Year	..	14	..	..	14
Fourth Year	..	6	..	..	6
School of Graduate Studies	..	..	..	..	53
Faculty of Dentistry—					
First Year	..	51	..	..	51
School of Nursing	11	..	..	11	..
College of Optometry of Canada	..	23	..	..	23
Totals	315	512	7	309	545

Department of Botany

	Lecture Courses		Laboratory Courses	
	1 or 2 or 3 hours			
	Pass	Honour	Pass	Honour
Faculty of Arts—				
First Year	85	138	7	138
Second Year	11	20	11	15
Third Year	8	4	8	4
Fourth Year	..	13	..	13
Faculty of Applied Science and Engineering—				
First Year	..	..	80	..
Faculty of Household Science—				
First Year	12	..	12	..
Faculty of Forestry—				
Fourth Year	..	6	..	6
School of Graduate Studies	..	26	..	26
Ontario College of Pharmacy				
First Year	141	..	141	..
Second Year	117	..	117	..
Totals	374	207	376	202

Department of Chemistry

	Pass	Pass and Honour	Honour	Laboratory
Faculty of Arts—				
First Year	169	..	166	256
Second Year	99	..	102	156
Third Year	27	..	26	53
Fourth Year	5	..	14	17
Teachers' Classes	33	..	..	33
Occasional Students	3	..	..	4
Faculty of Medicine—				
First Year	..	147	..	147
Second Year	..	106	..	91
Faculty of Applied Science and Engineering—				
First Year	..	105	..	105
Second Year	..	63	..	63
Third Year	..	147	..	120
Fourth Year	..	14	..	14
Faculty of Household Science—				
First Year	..	14	..	14
Second Year	..	4		..
Faculty of Forestry—				
First Year	14	..	..	14
Second Year	7	..	..	3
School of Graduate Studies	..	..	68	36
Faculty of Dentistry—				
First Year	..	53	..	53
Second Year	..	46	..	46
Third Year	..	47	..	47
Ontario College of Pharmacy—				
First Year	142	..	..	142
Second Year	120	..	..	119
Totals	619	746	376	1,533

Department of Fine Art

	Pass	Pass and Honour	Honour
Faculty of Arts—			
First Year	33	..	6
Second Year	39	24	7
Third Year	31	24	9
Fourth Year	..	23	..
Occasional Students	3	..	2
School of Graduate Studies	2	..	1
Totals	108	71	25

Department of Food Chemistry
(Faculty of Household Science)

	Pass	Honour	Laboratory
Faculty of Arts—			
Second Year	43	..	43
Third Year	21	..	21
Fourth Year	..	31	31
Faculty of Household Science—			
Second Year	4	..	4
Third Year	9	10	19
Fourth Year	..	3	3
Occasional Students	..	2	2
School of Graduate Studies	..	3	3
Totals	77	49	126

Department of Geography

	Pass	Pass and Honour	Honour	Laboratory
Faculty of Arts—				
First Year	83	46	22	151
Second Year	59	2	19	80
Third Year	58	1	..	59
Teachers' Classes	76	..	4	80
Occasional Students	7	..	..	7
Ontario College of Education	319	..	..	..
School of Graduate Studies	..	..	2	1
Totals	602	49	47	378

Department of Geology and Palaeontology

	Lecture Courses					Laboratory Courses	
	1 or 2 or 3 hours		4 or 5 or 6 hours		7 or more hours		
	Pass	Honour	Pass	Honour	Honour	Pass	Honour
Faculty of Arts—							
First Year	88	62	..	..	..	..	..
Second Year	34	19	..	..	..	15	19
Third Year	39	14	..	5	..	23	15
Fourth Year	..	..	..	6	5	..	11
Teachers' Classes	65	..	..	..	..	65	..
Faculty of Applied Science and Engineering—							
Second Year	89	..	..	..	..	63	..
Third Year	59	..	..	..	..	47	..
Fourth Year	31	..	2	..	..	33	..
Faculty of Forestry—							
Second Year	4	..	..	..	..	..	..
Third Year	9	..	..	..	..	..	..
School of Graduate Studies	..	6	..	15	2	..	23
Totals	418	101	2	26	7	246	68

Department of History

	Lecture Courses			
	1 or 2 or 3 hours		4 or 5 or 6 hours	7 or more hours
	Pass	Honour	Honour	Honour
Faculty of Arts—				
First Year	133	116	..	..
Second Year	118	39	79	22
Third Year	89	45	9	20
Fourth Year	5	7	31	9
Teachers' Classes	116	..	..	..
Occasional Students	3	2	9	..
School of Graduate Studies	..	8	16	..
Totals	464	217	144	51

Department of Household Science
(Faculty of Household Science)

	Pass	Pass and Honour	Honour	Laboratory
Faculty of Arts—				
First Year	..	..	69	..
Second Year	27	..	44	71
Third Year	15	..	28	43
Fourth Year	..	..	32	32
Faculty of Household Science—				
First Year	..	11	..	..
Second Year	..	4	..	4
Third Year	9	..	12	21
Fourth Year	..	..	3	3
School of Graduate Studies	..	..	3	1
Totals	51	15	191	175

Department of Italian and Spanish

	Italian		Spanish	
	Pass	Honour	Pass	Honour
Faculty of Arts—				
First Year	31	8	116	27
Second Year	22	7	54	20
Third Year	15	5	61	19
Fourth Year	..	4	1	14
School of Graduate Studies	..	2	..	6
Totals	68	26	232	86

Department of Law

	Pass	Honour
Faculty of Arts—		
First Year	..	104
Second Year	..	35
Third Year	..	30
Fourth Year	..	38
Faculty of Applied Science and Engineering—		
Third Year	60	..
Faculty of Forestry—		
Third Year	12	..
School of Graduate Studies	..	16
Department of University Extension—		
Evening Classes	40	..
Bachelor of Laws and Master of Laws Courses	..	12
Totals	112	235

Department of Mathematics

	Lecture Courses					
	1 or 2 or 3 hours		4 or 5 or 6 hours		7 or more hours	
	Pass	Honour	Pass	Honour	Pass	Honour
Faculty of Arts—						
First Year	42	178	..	..	..	40
Second Year	83	99	..	..	..	35
Third Year	59	44	..	..	..	4
Fourth Year	4	11	..	..	..	8
Teachers' Classes	15	..	..	..	..	..
Occasional Students	6	..	..	..	..	..
Faculty of Applied Science and Engineering—						
First Year	..	..	318	..	..	..
Second Year	118	..	42	..	..	..
Third Year	10	..	..	..	..	..
Faculty of Forestry—						
First Year	..	14	..	..	..	..
School of Graduate Studies	..	..	..	12	..	..
College of Optometry of Canada	16	..	..	..	..	..
Totals	353	346	360	12	..	87

Department of Military Studies

	Pass	Pass and Honour
Faculty of Arts—		
First Year	13	20
Second Year	14	13
Third Year	7	2
Fourth Year	..	1
Teachers' Classes	1	..
Faculty of Medicine—		
First Year	5	..
Second Year	4	..
Fourth Year	4	..
Sixth Year	1	..
Faculty of Applied Science and Engineering—		
First Year	23	..
Second Year	6	..
Third Year	2	..
Fourth Year	1	..
School of Graduate Studies	4	..
Faculty of Dentistry—		
First Year	1	..
Second Year	3	..
Ontario College of Pharmacy—		
Second Year	3	..
Totals	92	36

Department of Mineralogy and Petrography

	Pass	Pass and Honour	Honour	Laboratory
Faculty of Arts—				
First Year	23	..	..	23
Second Year	2	..	31	33
Third Year	..	2	20	14
Fourth Year	..	1	10	11
Teachers' Classes	93	..	..	93
Occasional Students	1	..	..	1
Faculty of Applied Science and Engineering—				
First Year	..	170	..	170
Second Year	..	43	..	43
Third Year	..	43	..	43
Fourth Year	..	2	..	2
Faculty of Forestry—				
Second Year	..	5	..	5
School of Graduate Studies	..	..	19	19
Totals	119	266	80	457

Department of Music

	Lecture Courses
	4 or 5 or 6 hours
	Honour
Faculty of Arts—	
First Year	9
Second Year	5
Total	14

Department of Philosophy

	Pass	Pass and Honour	Honour
Faculty of Arts—			
First Year	63	..	108
Second Year	136	..	78
Third Year	98	72	52
Fourth Year	44	..	60
Teachers' Classes	44	..	..
School of Graduate Studies	..	..	59
Department of Social Science—			
First Year	12	..	..
Totals	397	72	357

Department of Physics

	Pass	Pass and Honour	Honour	Laboratory
Faculty of Arts—				
First Year	122	..	170	215
Second Year	62	..	76	130
Third Year	30	..	28	55
Fourth Year	..	..	46	42
Teachers' Classes, Summer Session	7	..	..	5
Occasional Students	..	..	6	6
Candidates for Specialists' Certificates, Summer Session	..	..	7	5
Faculty of Medicine—				
First Year	..	146	..	146
Diploma in Radiology	..	..	3	3
Faculty of Applied Science and Engineering—				
First Year	..	..	23	23
Second Year	..	..	12	12
Third Year	..	..	9	9
Fourth Year	..	..	8	8
Faculty of Household Science—				
First Year	..	..	14	14
Candidates for Specialists' Certificates	..	..	1	1
Faculty of Forestry—				
First Year	14	..	..	14
School of Graduate Studies	..	..	60	24
Faculty of Dentistry—				
First Year	..	51	..	51
Department of University Extension—				
Aerial Navigation	..	20	..	19
Physiotherapy	24	..	..	24
College of Optometry of Canada	..	50	..	48
Totals	259	267	463	854

Department of Political Science

	Lecture Courses			
	1 or 2 or 3 hours		4 or 5 or 6 hours	7 or more hours
	Pass	Honour	Honour	Honour
Faculty of Arts—				
First Year	99	71	87	..
Second Year	177	15	2	77
Third Year	121	50	..	62
Fourth Year	59	38	..	74
Teachers' Classes	36	..	..	..
Occasional Students	2	3	..	..
Faculty of Household Science—				
Second Year	4	..	..	..
Third Year	15	..	..	..
Faculty of Forestry—				
Third Year	9	..	..	..
School of Graduate Studies	..	4	2	16
Totals	522	181	91	229

Department of Psychology

	Lecture Courses				Laboratory Courses	
	1 or 2 or 3 hours		4 or 5 or 6 hours	7 or more hours		
	Pass	Honour	Honour	Honour	Pass	Honour
Faculty of Arts—						
First Year.....	165	48	..	..	..	..
Second Year.....	155	26	2	11	155	13
Third Year.....	140	39	..	12	..	12
Fourth Year.....	..	58	7	9	..	19
Teachers' Classes..	70	..	..	..	48	..
Teachers' Classes, Summer Session	60	..	..	..	..	..
Teachers' Classes, Correspondence.	32	..	..	..	..	..
Occasional Students	4	..	..	..	2	..
Faculty of Medicine—						
Second Year.....	106	..	..	..	..	..
Third Year.....	..	..	..	..	..	17
Fourth Year.....	10	..	..	..	..	..
Faculty of Household Science.....	24	..	..	..	..	..
School of Graduate Studies.....	..	50	..	..	..	30
Department of Social Science—						
First Year.....	23	..	..	..	..	..
Second Year.....	4	..	..	..	..	..
School of Nursing...	15	..	..	..	..	..
Department of University Extension—						
Occupational Therapy	22	..	..	..	..	..
Physiotherapy....	23	..	..	..	..	..
Centralised Pupil Nurses.....	250	..	..	..	..	..
Evening Classes...	150	..	..	..	..	..
Workers' Educational Education	60	..	..	..	..	..
College of Optometry of Canada.....	25	..	..	..	29	..
Totals.....	1,338	221	9	32	234	91

(f) Registration in Courses in the Faculty of Arts

Courses	First Year				Second Year				Third Year				Fourth Year				
	U C	V C	T C	M C	U C	V C	T C	M C	U C	V C	T C	M C	U C	V C	T C	M C	Totals
Pass	136	113	53	70	136	103	54	92	128	81	50	54	..	..	..	..	1,070
General	..	..	..	..	..	..	..	..	14	16	..	2	7	19	5	3	66
Classics	1	3	..	1	2	5	..	1	4	2	3	1	5	1	..	..	29
English Language and Literature	13	16	9	3	16	15	4	5	9	11	1	1	..	..	..	..	103
Greek and Hebrew	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	1
Hebrew and Ancient History	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	1
Latin (French or Greek Option) Div. I	1	5	1	5	1	2	1	2	1	1	..	5	1	3	1	2	34
Latin (French or Greek Option) Div II					..	..	1	1	..	..	..	..	..	..	..	..	
Modern Languages	18	15	10	3	20	12	3	1	12	16	3	3	15	15	8	4	158
Oriental Languages	..	..	..	..	3	1	..	..	..	2	..	..	2	..	..	..	8
English and History	..	..	..	..	..	..	..	..	..	..	..	..	6	13	2	4	25
Fine Art	3	2	2	..	5	1	..	1	3	2	1	..	..	..	..	..	20
Law	7	4	3	..	25	5	1	1	12	5	6	1	22	2	4	..	98
Social and Philosophical Studies	40	27	10	6	..	..	..	..	..	..	..	..	..	..	..	..	83
Modern History	..	..	..	..	14	5	3	..	9	5	6	..	3	2	4	..	51
Music	3	3	2	1	..	4	..	1	..	..	..	..	..	..	..	..	14
Philosophy	..	..	..	..	3	..	1	4	3	1	..	1	1	5	1	7	27
Philosophy (English or History Option)	..	4	1	..	3	4	1	4	..	1	4	1	3	5	4	6	41
Political Science and Economics	..	..	..	..	10	5	2	..	8	7	10	1	7	7	10	1	68
Psychology	..	..	..	..	8	1	2	..	10	2	..	..	4	4	1	..	32
Sociology	..	..	..	..	8	5	1	..	5	7	2	..	5	8	..	..	41
Mathematics and Physics (Div. I)									1	3	1	..	..	2	..	..	
Mathematics and Physics (Div. II)	19	8	6	2	15	15	2	2	2	1	1	..	5	1	1	1	105
Mathematics and Physics (Div. III)									1	..	..	..	1	..	..	..	
Mathematics and Physics (Div. IV)									3	4	1	..	5	1	1	..	
Physics and Chemistry	..	..	..	..	5	4	..	1	1	2	..	..	3	..	..	..	16
Physics and Geology	..	..	..	..	..	1	..	..	..	..	..	..	1	..	..	..	2
Science	23	24	7	5	..	..	..	..	..	..	..	..	..	..	..	..	59
Biological and Medical Sciences	..	..	..	..	3	2	1	..	5	4	2	..	4	6	..	1	28
Biology	..	..	..	..	3	2	..	..	1	2	..	..	2	1	2	..	13
Biology and Physics	..	..	..	..	1	1	..	..	1	..	..	..	..	..	..	..	3
Chemistry	..	..	..	..	8	1	5	3	3	5	..	1	4	1	2	..	33
Chemistry, Mineralogy and Geology, Div. I	..	..	..	..	6	3	..	..	1	3	..	..	..	..	..	..	21
Chemistry, Mineralogy and Geology, Div. II	..	..	..	..					1	2	..	..	2	2	1	..	
Food Chemistry	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Geology and Mineralogy	..	..	..	..	1	2	1	..	2	2	..	..	2	2	..	..	12
Household Economics	31	20	11	1	23	18	3	1	13	13	1	..	16	10	2	..	163
Physics	..	..	..	..	..	..	..	..	..	..	..	..	2	1	..	1	4
Physiology and Biochemistry	..	..	..	..	..	3	1	..	1	1	..	..	3	1	..	..	10
Commerce and Finance	36	29	16	6	27	17	14	2	20	11	6	1	22	16	7	3	233
Exchange Students	..	..	..	..	2	2	..	..	..	..	..	..	..	..	..	..	4
Registered twice	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	1
Totals	331	273	131	103	348	240	101	122	274	212	98	72	153	128	56	33	2,675

(g) Registration in Courses in the School of Graduate Studies

Department	Ph.D.	M.A.	M. Com.	M.S.	M.A. Sc.	E.E.	Mech.E.	D. Paed.	M.Sc. F.	Mus. Doc.	M.Sc. (Dent.)	M.S.A.	Grad. Stud.	Auditor
Anatomy	..	2	..	..	..	..	..	..	..	..	..	..	1	..
Anthropology	..	..	..	..	..	..	..	..	..	..	..	..	3	..
Applied Mathematics	2	1	..	..	..	..	..	..	..	..	..	..	..	..
Astronomy	..	1	..	..	..	..	..	..	..	..	..	..	..	..
Biochemistry	7	5	..	..	..	..	..	..	..	..	..	1	3	..
Biology	15	7	..	..	..	..	..	..	..	..	..	4	7	..
Botany	13	2	..	..	..	..	..	..	..	..	..	3	3	..
Chemistry	19	18	..	..	..	..	..	..	..	..	..	3	1	..
Chemical Engineering	2	..	..	..	13	..	..	..	..	..	..	..	..	..
Chinese Archaeology	1	2	..	..	..	..	..	..	..	..	..	..	..	..
Civil Engineering	..	..	..	..	4	..	..	..	..	..	..	..	..	..
Classics	5	8	..	..	..	..	..	..	..	..	..	..	4	..
Dentistry	..	..	..	..	..	..	..	..	..	..	4	..	..	..
Educational Theory	..	..	..	..	..	..	..	..	..	..	..	..	..	1
Electrical Engineering	..	..	..	..	..	1	..	..	..	..	..	..	..	..
English	5	21	..	..	..	..	..	..	..	..	..	..	26	..
Food Chemistry	..	1	..	..	..	..	..	..	..	..	..	..	1	..
Forestry	1	..	..	..	..	..	..	..	1	..	..	..	..	..
Geography	..	..	..	..	..	..	..	..	..	..	..	..	2	..
Geology and Palaeontology	5	6	..	..	..	..	..	..	..	..	..	..	6	..
Germanic Languages	..	3	..	..	..	..	..	..	..	..	..	..	3	..
History	4	9	..	..	..	..	..	..	..	..	..	..	9	..
Household Science	..	4	..	..	..	..	..	..	..	..	..	..	..	..
Law	..	2	..	..	..	..	..	..	..	..	..	..	2	..
Mathematics	5	1	..	..	..	..	..	..	..	..	..	..	5	..
Mechanical Engineering	3	..	..	..	..	..	2	..	..	..	..	..	..	..
Metallurgical Engineering	..	..	..	..	2	..	..	..	..	..	..	..	..	..
Mineralogy	1	1	..	..	..	..	..	..	..	..	..	..	..	..
Mining Engineering	..	..	..	..	2	..	..	..	..	..	..	..	..	..
Music	..	..	..	..	..	..	..	..	..	4	..	..	..	..
Pathological Chemistry	3	..	..	..	..	..	..	..	..	..	..	..	..	..
Pedagogy	..	..	..	..	..	..	..	55	..	..	..	..	..	..
Pharmacology	2	..	..	..	..	..	..	..	..	..	..	..	..	1
Philosophy	13	14	..	..	..	..	..	..	..	..	..	..	22	..
Physics	12	18	..	..	..	..	..	..	..	..	..	..	2	..
Physiology	2	7	..	..	..	..	..	..	..	..	..	..	..	..
Physiological Hygiene	3	..	..	..	..	..	..	..	..	..	..	..	..	..
Political Science	..	9	1	..	..	..	..	..	..	..	..	1	11	..
Preventive Dentistry	1	..	..	..	..	..	..	..	..	..	..	..	..	..
Psychiatry	..	..	..	..	..	..	..	..	..	..	..	..	1	..
Psychology	6	23	..	..	..	..	..	..	..	..	..	..	10	..
Romance Languages	2	10	..	..	..	..	..	..	..	..	..	..	12	..
Surgery	..	..	..	3	..	..	..	..	..	..	..	..	..	..
Special Committees	2	2	..	..	3	..	..	..	..	..	..	..	11	..
Totals	134	177	1	3	24	1	2	55	1	4	4	12	145	2

(*h*) Results of the Annual Examinations

Faculty of Arts

First Year

Course	University of Toronto	Univ. Coll.	Vic. Coll.	Trin. Coll.	St. M. Coll.	TOTALS	Passed	Conditioned	Failed	Transferred	Aegrotat	Debarred
Pass	..	131	107	50	69	357	242	64	51	..	..	66
Supplementals	..	90	72	33	38	233	164	68	1	..	..	..
Classics	..	1	2	..	1	4	4	..	..	..	..	..
English Language and Literature	..	13	16	8	3	40	36	3	1	2	1	2
Latin (French or Greek Option)	..	1	5	1	5	12	10	1	1	..	..	..
Modern Languages	..	18	14	10	2	44	42	2	..	2	..	..
Fine Art	..	2	2	2	..	6	5	1	..	..	..	..
Law	..	5	4	3	..	12	11	1	..	1	1	..
Social and Philosophical Studies	..	39	26	10	5	80	68	10	2	11	1	3
Music	..	3	3	2	1	9	6	3	..	1	..	..
Philosophy (English or History Option)	..	..	4	1	..	5	4	..	1	1	..	..
Mathematics and Physics	..	18	8	5	1	32	21	6	5	..	2	..
Science	..	23	23	8	5	59	38	18	3	..	5	1
Household Economics	..	31	20	11	1	63	56	7	..	6	1	..
Commerce and Finance	..	33	29	16	6	84	58	21	5	3	2	..
Occasional Students	..	3	..	..	..	3	2	1	..	..	..	..
Totals	..	411	335	160	137	1,043	767	206	70	27	13	72

Second Year

Course	University of Toronto	Univ. Coll.	Vic. Coll.	Trin. Coll.	St. M. Coll.	TOTALS	Passed	Conditioned	Failed	Aegrotat	Debarred
Pass	..	131	102	52	87	372	263	72	37	6	11
Supplementals	..	50	31	11	22	114	82	32	..	..	..
Classics	..	1	5	..	1	7	6	..	1	..	..
English Language and Literature	..	16	14	3	5	38	33	..	5	3	..
Hebrew and Ancient History	..	..	1	..	..	1	..	..	1	..	..
Latin (French or Greek Option) Div. I	..	1	2	1	2	6	6	..	..	..	..
Latin (French or Greek Option) Div. II	..	..	..	1	1	2	2	..	..	..	..
Modern Languages	..	20	11	4	1	36	31	1	4	..	..
Oriental Languages	..	2	1	..	..	3	2	1	..	..	..
Fine Art	..	5	1	..	1	7	6	1	..	..	1
Law	..	25	5	1	1	32	28	..	4	1	..
Modern History	..	14	5	3	..	22	18	4	..	1	1
Music	..	..	4	..	1	5	5	..	..	1	..
Philosophy	..	3	..	1	4	8	7	..	1	..	..
Philosophy (English or Hist. Option)	..	3	4	1	4	12	10	1	1	1	1
Political Science and Economics	..	10	5	2	..	17	8	6	3	..	1
Psychology	..	8	1	2	..	11	8	2	1	..	..
Sociology	..	7	5	1	..	13	13	..	..	..	1
Mathematics and Physics	..	15	14	2	2	33	21	3	9	1	1
Physics and Chemistry	..	5	3	..	1	9	3	1	5	..	..
Physics and Geology	..	..	1	..	..	1	..	..	1	..	..
Biological and Medical Sciences	..	3	3	1	..	7	6	1	..	..	..
Biology	..	3	1	..	..	4	4	..	..	..	..
Biology and Physics	..	1	1	..	..	2	2	..	..	..	..
Chemistry	..	9	1	5	3	18	10	2	6	..	1
Chemistry, Mineralogy and Geology	..	6	3	..	..	9	6	..	3	..	..
Geology and Mineralogy	..	1	2	1	..	4	3	..	1	..	..
Household Economics	..	23	17	3	1	44	32	6	6	1	..
Physiology and Biochemistry	..	..	3	1	..	4	2	1	1	..	1
Commerce and Finance	..	26	17	13	2	58	36	9	13	1	4
Exchange Students	..	2	2	..	..	4	4	..	..	..	..
Registered twice	2	1	..	..	1	4	4	..	..	..	..
Totals	2	391	265	109	140	907	661	143	103	16	23

Third Year

Course	University of Toronto	Univ. Coll.	Vic. Coll.	Trin. Coll.	St. M. Coll.	TOTALS	Passed	Conditioned	Failed	Aegrotat	Debarred
Pass	..	132	78	51	54	315	260	44	11	4	..
Supplementals	..	54	37	13	15	119	96	20	3	..	..
General	..	14	16	..	2	32	30	..	2	..	..
Classics	..	4	2	3	1	10	9	..	1	1	..
English Language and Literature	..	9	11	1	1	22	19	1	2	..	..
Greek and Hebrew	..	..	1	..	..	1	1	..	..	..	..
Latin (French or Greek Option), Div. I	..	1	1	..	5	7	7	..	..	..	..
Modern Languages	..	11	15	3	3	32	31	1	..	..	..
Oriental Languages	..	..	2	..	..	2	1	1	..	..	..
Fine Art	..	3	2	1	..	6	5	1	..	1	..
Law	..	12	5	6	1	24	23	1	..	..	..
Modern History	..	9	5	6	..	20	19	1	..	..	..
Philosophy	..	2	1	..	1	4	4	..	..	..	..
Philosophy (English or History Option)	..	..	1	4	1	6	5	1	..	..	..
Political Science and Economics	..	8	7	10	1	26	23	..	3	..	..
Psychology	..	10	2	..	..	12	12	..	..	..	..
Sociology	..	5	6	2	..	13	12	1	..	..	..
Mathematics and Physics, Div. I	..	..	3	1	..	4	4	..	..	..	..
Mathematics and Physics, Div. II	..	2	1	1	..	4	4	..	..	..	..
Mathematics and Physics, Div. III	..	1	..	..	..	1	1	..	..	..	..
Mathematics and Physics, Div. IV & V	..	3	4	1	..	8	8	..	..	..	..
Physics and Chemistry	..	1	2	..	..	3	3	..	..	..	..
Biological and Medical Sciences	..	5	4	2	..	11	9	..	2	..	..
Biology	..	1	2	..	..	3	3	..	..	..	..
Biology and Physics	..	1	..	..	..	1	1	..	..	..	..
Chemistry	..	3	5	..	1	9	4	2	3	..	..
Chemistry, Mineralogy and Geology, Div. I	..	1	3	..	..	4	2	..	2	..	..
Chemistry, Mineralogy and Geology, Div. II	..	1	2	..	..	3	3	..	..	..	..
Geology and Mineralogy	..	2	2	..	..	4	4	..	..	..	1
Household Economics	..	12	13	1	..	26	21	2	3	..	..
Physiology and Biochemistry	..	1	1	..	..	2	1	..	1	..	..
Commerce and Finance	..	20	11	6	1	38	25	8	5	..	1
Occasional Students	6	1	..	..	..	7	7	..	..	..	..
Registered twice	..	..	1	..	..	1	1	..	..	..	..
Totals	6	329	244	112	87	778	656	84	38	6	..

Fourth Year

Course	University of Toronto	Univ. Coll.	Vic. Coll.	Trin. Coll.	St. M. Coll.	TOTALS	Passed	Conditioned	Failed	Aegrotat	Degree without Honours
Supplementals	..	..	1	..	..	1	1	..	..	..	..
General	..	6	19	5	3	33	32	..	1	1	..
Classics	..	5	1	..	..	6	6	..	..	..	3
Latin (French or Greek Option), Div. I	..	1	3	1	2	7	7	..	..	..	..
Modern Languages	..	15	15	8	4	42	42	..	..	1	..
Oriental Languages	..	2	..	..	..	2	2	..	..	..	..
English and History	..	6	13	2	4	25	25	..	..	..	..
Law	..	22	2	4	..	28	27	..	1	..	1
Modern History	..	3	2	4	..	9	9	..	..	..	..
Philosophy	..	1	5	1	7	14	14	..	..	..	..
Philosophy (English or History Option)	..	3	5	4	6	18	18	..	..	..	..
Political Science and Economics	..	7	7	10	1	25	25	..	..	1	..
Psychology	..	4	4	1	..	9	9	..	..	..	..
Sociology	..	5	8	..	..	13	13	..	..	..	..
Mathematics and Physics, Div. I	..	..	2	..	..	2	2	..	..	..	..
Mathematics and Physics, Div. II	..	5	1	1	1	8	8	..	..	..	..
Mathematics and Physics, Div. III	..	1	..	..	..	1	1	..	..	..	..
Mathematics and Physics, Div. IV	..	5	1	1	..	7	7	..	..	..	..
Physics and Chemistry	..	3	..	..	..	3	3	..	..	..	..
Physics and Geology	..	1	..	..	..	1	1	..	..	..	..
Biological and Medical Sciences	..	4	6	..	1	11	11	..	..	..	..
Biology	..	2	1	2	..	5	5	..	..	..	..
Chemistry	..	4	1	2	..	7	6	1	..	..	1
Chemistry, Mineralogy and Geology, Div. II	..	2	2	1	..	5	5	..	..	..	..
Geology and Mineralogy	..	2	2	..	..	4	4	..	..	..	..
Household Economics	..	15	10	2	..	27	27	..	..	1	..
Physics	..	2	1	..	1	4	4	..	..	1	..
Physiology and Biochemistry	..	3	1	..	..	4	4	..	..	..	1
Commerce and Finance	..	22	16	7	3	48	47	1	..	..	..
Occasional Students	..	1	1	..	..	2	1	1	..	..	..
Totals	..	152	130	56	33	371	366	3	2	5	6

Pass Course for Teachers

	Passed	Conditioned	Total
August Examination	299	62	361
May Examination	458	109	567
	757	171	928

Faculty of Medicine

	Passed	Conditioned	Failed
First Year	82	9	45
Second Year	58	21	25
Third Year	73	26	19
Fourth Year	105	29	4
Fifth Year	112	18	2
Sixth Year	125	9	4
Candidates for Degree of B.Sc. (Med.)	3	..	..
Candidates for Diploma in Public Health	16	..	1
Candidate for Diploma in Radiology	1	..	..
Totals	575	112	100

Faculty of Applied Science and Engineering

	Passed with Honours	Passed	Conditioned	Failed
First Year—				
Civil Engineering	2	5	9	3
Mining Engineering	4	11	7	11
Mechanical Engineering	8	25	21	22
Architecture	2	3	5	..
Engineering Physics	9	6	3	3
Chemical Engineering	5	14	25	31
Electrical Engineering	3	11	9	13
Metallurgical Engineering	1	9	11	1
Mining Geology	..	3	1	3
Second Year—				
Civil Engineering	5	9	11	1
Mining Engineering	2	14	11	4
Mechanical Engineering	7	10	20	7
Architecture	1	1	..	1
Engineering Physics	6	4	..	2
Chemical Engineering	13	11	12	12
Electrical Engineering	6	12	7	4
Metallurgical Engineering	6	6	2	3
Mining Geology	1	4	3	1
Third Year—				
Civil Engineering	1	10	1	1
Mining Engineering	8	22	10	1
Mechanical Engineering	4	14	9	2
Architecture	1	2	..	..
Engineering Physics	3	3	3	..
Chemical Engineering	6	19	13	3
Electrical Engineering	3	17	8	5
Metallurgical Engineering	7	13	9	3
Mining Geology	..	2	..	..
Fourth Year—				
Civil Engineering	..	9	8	..
Mining Engineering	8	15	2	3
Mechanical Engineering	3	9	2	3
Architecture	1	..	..	..
Engineering Physics	2	1	2	..
Chemical Engineering	14	35	2	1
Electrical Engineering	8	11	3	..
Metallurgical Engineering	3	7	4	..
Mining Geology	..	2	..	..
Fifth Year—				
Architecture	..	6	..	..
Totals	153	355	233	144

Faculty of Household Science

	Passed	Conditioned	Failed
First Year	3	3	3
Second Year	2	1	1
Third Year	11	6	4
Fourth Year	2	1	..
Occasional Students	2	..	..
Totals	20	11	8

Ontario College of Education

	Passed	Failed
*High School Assistants' Course	342	..
Specialists' Courses	137	..
First Class Public School Course	41	..
Elementary Art Course	26	..
Elementary Commercial Course (passed in part)	22	..
Elementary Home Economics	18	..
Elementary Music Course	37	..
Elementary Physical Education Course	70	..
Elementary Shop Work	20	..
Intermediate Art Course	11	..
Intermediate Home Economics	25	..
Intermediate Music Course	37	..
Librarians' Course—		
Candidates for Degree of B.L.S	40	..
Candidates for Diploma	6	..
Bachelor of Pedagogy Course—		
Candidates for Degree of B.Paed	31	..
Passed in part	80	..
Number who failed in whole or part	..	136
Totals	943	136

*Many of these are included among those who passed or failed in the other courses in this list.

Faculty of Forestry

	Passed	Conditioned	Deferred	Failed
First Year	11	1	..	2
Second Year	...	1	..	3
Third Year	8	..	..	1
Fourth Year	4	2	..	..
Totals	23	4	..	6

Faculty of Music

	Passed	Conditioned	Failed
First Year	7	..	3
Second Year	14	7	4
Third Year	7	11	5
Totals	28	18	12

Faculty of Dentistry

	Passed	Conditioned	Failed
First Year	30	20	..
Second Year	32	14	1
Third Year	30	19	..
Fourth Year	33	4	..
Fifth Year	48	1	..
Dental Nurses	11	3	1
Totals	184	61	2

Departments

The numbers examined in the different departments of the University, including those persons granted standing for military service, were as follows:

Arts:		
Fourth Year	371	
Third Year	778	
Second Year	907	
First Year	1,043	
Pass Course for Teachers	928	
Graduates (Specialist Standing)	57	
		4,084
Medicine:		
Sixth Year	138	
Fifth Year	132	
Fourth Year	138	
Third Year	118	
Second Year	104	
First Year	136	
Candidates for Degree of B.Sc. (Med.)	3	
Candidates for Diploma in Public Health	17	
Candidate for Diploma in Radiology	1	
		787
Applied Science and Engineering:		
Fifth Year	6	
Fourth Year	158	
Third Year	203	
Second Year	219	
First Year	299	
		885
Household Science		39
Education		693
Forestry		33
Music		58
Graduate Studies		450
Dentistry		247
Social Science		87
School of Nursing		115
Physical Education for Women		24
University Extension:		
Occupational Therapy		48
Physiotherapy		46
Aerial Navigation		20
Law		10
Pharmacy		265
Agriculture		116
Veterinary Science		67
Local Examinations in Music		13,608

(*i*) Admission to Degrees:

	Men	Women	Total
LL.D. (Honorary)	7	2	9
D.Sc. (Honorary)	2	...	2
D.Eng. (Honorary)	1	...	1
Mus.Doc. (Honorary)	1	...	1
Ph.D	28	4	32
M.A	79	30	109
M.Com.	1	...	1
M.S	2	1	3
M.A.Sc	13	...	13
Mech.E	2	...	2
D.Paed	3	...	3
Mus.Doc	1	...	1
M.S.A	5	...	5
B.A	365	313	678
B.Com	46	1	47
M.D	126	11	137
B.Sc. (Med.)	3	...	3
B.A.Sc	153	...	153
B.Arch	8	...	8
B.H.Sc	...	9	9
B.Paed	28	3	31
B.L.S	2	38	40
B.Sc.F	4	...	4
Mus. Bac	3	4	7
D.D.S	19	1	20
B.Sc. (Dent.)	1	...	1
LL.B	2	...	2
B.S.A	109	1	110
B.V.Sc	64	1	65
Phm.B	85	7	92
Totals	1,163	426	1,589

(*j*) Admission to Diplomas and Certificates

	Men	Women	Total
Dental Nursing	..	12	12
Librarianship	..	6	6
Occupational Therapy	..	17	17
Physiotherapy	..	17	17
Psychiatry	4	2	6
Public Health	21	1	22
Public Health Nursing	..	76	76
Radiology	1	..	1
Social Science	4	24	28
Totals	30	155	185

(*k*) Geographical Distribution of Students:

FACULTY OF ARTS

	University of Toronto	University College	Victoria College	Trinity College	St. Michael's College	Duplicates	Totals
Ontario: (1) Province	499	464	340	132	91	..	1,526
(2) Toronto	566	609	435	238	130	4	2,024
Nova Scotia	5	2	2	..	..	..	9
New Brunswick	2	2	1	2	..	..	7
Prince Edward Island	..	..	..	..	..	..	..
Quebec	7	2	3	..	1	..	13
Manitoba	6	3	2	1	..	..	12
Saskatchewan	3	12	4	2	1	..	22
Alberta	4	10	2	2	6	..	24
British Columbia	4	6	2	3	2	..	17
United States	1	9	5	4	99	..	118
Elsewhere	3	9	13	3	3	..	31
Totals	1,100	1,128	859	387	333	4	3,803

THE UNIVERSITY

	Faculty of Arts	Faculty of Medicine	Faculty of Applied Science and Engineering	Faculty of Household Science	Ontario College of Education	Faculty of Forestry	Faculty of Music	School of Graduate Studies	Faculty of Dentistry	Department of Social Science	School of Nursing	Physical Education for Women	Occupational Therapy	Physiotherapy	Aerial Navigation	Registered Twice	TOTALS
Ontario:																	
(1) Province	1,526	297	347	24	522	12	21	149	92	20	273	5	29	12	12	18	3,323
(2) Toronto	2,024	440	538	12	242	17	23	243	88	38	116	18	12	16	5	33	3,799
Nova Scotia	9	..	1	..	18	..	1	23	..	4	9	..	..	..	1	1	65
New Brunswick	7	8	..	..	7	..	..	12	1	1	6	..	..	..	..	..	42
Prince Edward Island	..	3	..	..	1	..	..	..	..	1	..	..	..	..	..	..	5
Quebec	13	9	3	1	4	2	3	7	..	2	8	..	2	1	1	1	55
Manitoba	12	1	5	..	7	..	1	24	12	10	3	..	1	3	..	..	79
Saskatchewan	22	32	10	4	23	1	1	24	27	3	4	1	..	9	..	..	160
Alberta	24	10	8	..	2	..	..	17	5	4	10	..	..	3	1	..	84
British Columbia	17	23	3	2	12	..	..	15	3	1	1	..	2	..	..	..	79
United States	118	4	5	..	1	..	5	36	5	..	1	..	..	..	..	..	175
Elsewhere	31	8	4	1	5	1	..	15	18	4	8	..	1	..	..	2	94
Totals	3,803	835	924	44	844	33	55	565	251	88	439	24	47	44	20	56	7,960

THE PROVINCE OF ONTARIO

	Faculty of Arts	Faculty of Medicine	Faculty of Applied Science and Engineering	Faculty of Household Science	Ontario College of Education	Faculty of Forestry	Faculty of Music	School of Graduate Studies	Faculty of Dentistry	Department of Social Science	School of Nursing	Physical Education for Women	Occupational Therapy	Physiotherapy	Aerial Navigation	Registered Twice	TOTALS
Algoma	20	8	5	..	5	..	..	..	2	..	5	..	..	2	..	1	46
Brant	33	11	9	..	10	1	2	3	..	..	4	1	1	1	..	1	75
Bruce	25	3	2	..	12	..	..	1	2	2	6	..	..	..	..	..	53
Carleton	80	16	11	1	40	..	1	14	7	1	26	2	..	1	..	3	197
Cochrane	21	4	9	..	10	..	..	..	2	..	..	1	2	1	..	1	49
Dufferin	17	2	2	..	2	..	2	1	..	..	2	..	..	..	..	..	28
Dundas	2	..	5	..	4	..	..	..	..	..	1	..	..	..	..	..	12
Durham	25	2	1	..	3	..	..	2	1	..	3	..	..	..	1	..	38
Elgin	10	2	7	..	8	..	..	..	1	..	1	..	..	..	..	..	29
Essex	57	9	13	..	26	..	1	6	4	..	9	..	..	..	..	..	125
Frontenac	4	..	1	3	14	..	..	2	1	..	7	..	1	1	..	..	34
Glengarry	1	..	1	..	3	..	..	..	..	2	1	..	..	..	..	..	8
Grenville	9	2	..	..	4	..	..	..	..	..	..	..	..	..	..	..	15
Grey	42	4	10	1	11	1	..	2	3	1	2	..	..	..	1	..	78
Haldimand	10	3	3	1	5	..	..	2	..	..	..	..	1	1	..	..	26
Haliburton	1	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	2
Halton	36	5	10	..	11	..	..	1	2	1	9	..	2	..	2	..	79
Hastings	12	3	3	..	7	1	..	..	3	..	5	..	..	..	1	..	35
Huron	34	3	1	..	13	1	..	2	..	..	3	..	..	..	1	..	58
Kenora	..	2	1	..	2	..	..	1	2	..	3	..	..	..	..	..	11
Kent	13	5	11	..	11	..	1	3	2	1	2	..	..	..	..	1	48
Lambton	32	7	7	1	11	1	..	2	4	..	3	..	..	..	..	..	68
Lanark	13	3	3	..	4	..	..	2	2	1	1	..	..	..	..	..	29
Leeds	13	1	1	..	5	..	..	2	3	..	5	..	..	..	..	..	30
Lennox and Addington	4	..	..	..	2	..	..	..	..	..	1	..	..	..	..	..	7
Lincoln	48	10	24	3	5	1	..	4	2	..	10	..	2	1	..	..	110
Manitoulin	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1
Middlesex	25	2	7	2	41	1	1	10	1	2	10	..	1	..	1	..	104
Muskoka	18	3	3	1	1	..	..	2	..	..	3	..	..	..	..	..	31
Nipissing	26	16	8	..	16	..	1	1	5	..	4	..	..	..	..	..	77
Norfolk	8	..	2	..	3	..	..	2	4	..	2	..	..	1	..	..	22
Northumberland	17	4	4	..	5	..	1	..	2	..	6	..	..	..	..	..	39
Ontario	47	8	7	..	15	..	1	3	4	..	12	..	..	..	..	1	96
Oxford	25	10	8	..	3	..	1	2	1	1	2	..	1	1	..	1	54
Parry Sound	21	1	2	..	3	..	..	1	1	..	4	..	1	..	..	..	34
Peel	63	5	15	1	4	..	1	3	1	..	10	..	..	..	1	..	104
Perth	41	9	5	1	14	..	..	2	1	..	2	..	1	..	..	1	75
Peterborough	34	6	5	..	6	..	1	2	1	1	9	..	..	1	..	..	66
Prescott	..	1	..	..	4	..	..	1	..	..	1	..	..	..	..	..	7
Prince Edward	7	1	1	..	1	..	..	..	..	..	..	..	..	..	..	..	10
Rainy River	6	5	1	..	1	..	..	1	..	..	2	..	..	..	..	..	16
Renfrew	16	1	3	..	8	1	..	2	..	..	2	..	..	..	..	..	33
Russell	1	..	..	..	1	..	..	1	..	..	..	..	1	..	..	..	4
Simcoe	73	11	13	1	10	..	1	7	6	1	16	..	3	..	1	1	142
Stormont	7	1	1	..	3	..	..	..	..	..	2	..	..	..	..	..	14
Sudbury	15	..	3	..	1	..	..	..	..	..	..	..	..	..	..	..	19
Thunder Bay	28	5	8	..	9	..	1	2	3	..	4	..	..	..	..	..	60
Timiskaming	17	6	4	1	4	1	..	2	..	..	5	..	..	..	..	..	40
Victoria	32	3	2	..	6	..	1	..	2	..	1	..	..	..	..	..	47
Waterloo	46	13	11	3	15	..	..	5	4	1	9	..	..	..	..	..	107
Welland	36	13	17	..	17	..	1	7	4	..	5	..	2	..	1	1	102
Wellington	50	15	11	1	11	..	1	12	6	2	10	..	..	1	..	1	119
Wentworth	76	25	27	2	68	..	2	19	..	2	21	..	3	..	..	1	244
York	228	28	38	1	24	3	..	12	3	1	22	1	7	..	2	4	366
Toronto	2,024	440	538	12	242	17	23	243	88	38	116	18	12	16	5	33	3,799
Totals	3,550	737	885	36	764	29	44	392	180	58	389	23	41	28	17	51	7,122

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